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PUBLIC WORKS.
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Memphis' New Waterworks*

A new system of wells and new pumping plant replacing the old. Reducing high carbonic acid and iron content of the well water by aeration and filtration. Wells and well houses located on residence properties.

By F. G. Cunningham†

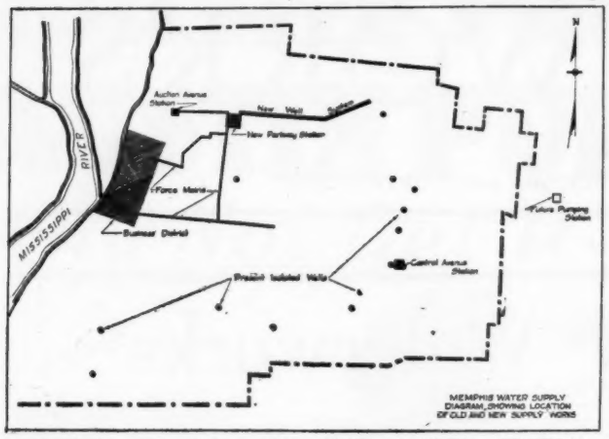
There is now being constructed at Memphis, Tennessee, a new water supply works which is not merely an extension or supplement to the old works but replaces practically all of them except the distribution system. The total cost will be approximately $2,800,000. The new works contain a number of features of more than ordinary interest, some of which are described below.

EXISTING WORKS

Memphis has a population of about 165,000 and the average consumption is about 13,000,000 gallons per day. For thirty-three years it has obtained its water supply by means of drilled wells from a stratum of sand known as the LaGrange formation. Since the first wells were put in service in 1890 the ground water plane has lowered between 5 and 10 feet, probably because of the frictional resistance in the sand due to the growing demand. The wells were scattered widely over the area of the city, those first driven contributing about 7,000,000 gallons daily to the Auction Avenue station, while others driven in 1908 contribute about 4,000,000 per day to the Central Avenue station, about 4 miles east of the other. Since then the supply has been further increased by fourteen isolated pump-

*Condensed from a paper before the American Society for Municipal Improvements.
†Resident supervising engineer for Fuller & McClintock, the designing and constructing engineers.

VIEW OF INTERIOR OF ENGINE ROOM.
Air compressors are seen along the left wall and pumping engines being assembled along the right of the central aisle.



LOCATION OF OLD AND NEW WATER SUPPLY WORKS OF MEMPHIS.

ing stations scattered about the outskirts of the city, each containing an electrically driven centrifugal deep-well pump delivering water directly into the mains, the total amount from these isolated stations being about 9,000,000 gallons daily.

A study of the population records led to an expectation that by 1950 the population will be 300,000 and the average daily consumption 31,000,000 gallons.

These combined facilities are now proving inadequate, are inexpensive of operation and in rather poor physical condition, and after thoroughly investigating the present plant the engineers decided that no part of these works could be retained to advantage in the new development.

At the request of the city officials, a separate high pressure fire protection system was considered but was not recommended, as it was believed that its cost could be applied with greater good to betterments of the general water system and fire engine apparatus, and this opinion was endorsed by the National Board of Fire Underwriters.

It was advised that a new station could be located convenient to the western part of the city in which is found about three-quarters of the population and all of the downtown business district and most of the industrial plants, this station to have a capacity to serve the entire city for a period of seven or eight years, at the expiration of which period another development could be constructed further east, in which direction it is expected that the city will grow, the station now being completed thereafter to serve the older or western portion of the city alone.

RIVER WATER VS. WELL WATER

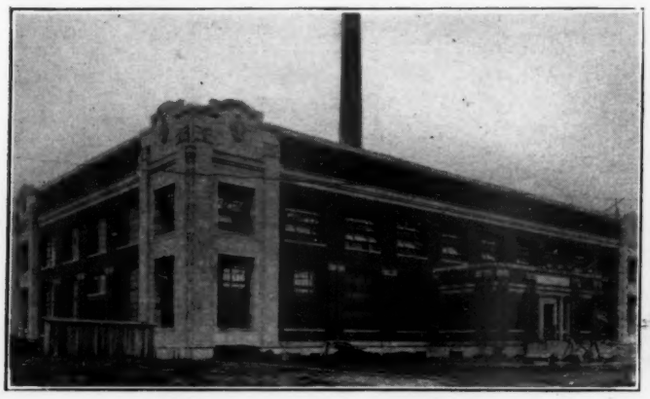
Two sources of supply were considered—wells and the Missouri river. There appeared to be abundance of ground-water available and this is naturally excellent in quality, being clear, cool, soft and practically free from organic matter and bacteria. However, it contains carbonic acid ranging from 90 to 130 parts per million, which makes it highly corrosive of cast-iron pipe, and also contains iron in quantities varying from 0.2 part to 6 parts per million, whereas when the amount exceeds 0.4 part it causes unsightly stains on plumbing fixtures, kitchen utensils and clothing washed in it. On the other hand, the river water is much harder than the well water and noticeably warmer in summer, and it would cost more to remove the sediment and bacteria from the river water than to remove the iron and carbonic acid from the well water; also a satisfactory intake in the river would be difficult and expensive to construct. (See PUBLIC WORKS for October, 1922). It was therefore decided to continue the use of well water but to treat it by removing a large part of the dissolved iron and carbon dioxide.

Good water-bearing sand is reached at a depth of 300 to 450 feet and varies in thickness from 50 feet to 150 feet. It outcrops about 40 miles to the east in an irregular strip about 40 miles wide and 250 miles long.

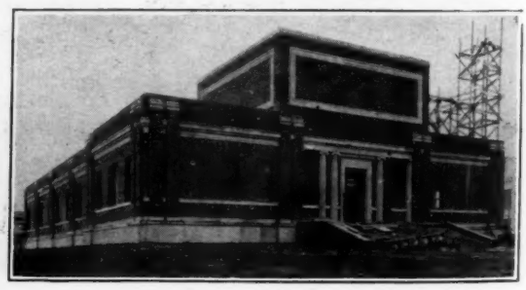
It was found by chemical investigation that the water now being pumped from the wells by air lift is much better as regards iron and CO_2 than that pumped by other methods, the former method not only removing 80 per cent. of the CO_2 but bringing the iron to a highly dispersed or colloidal condition, in which condition it is less troublesome than in the usual forms. Air lift pumping, however, does not *remove* the iron nor take out enough of the CO_2 to prevent the effluent from attacking iron pipes, and it was decided, after considerable experimenting, to equip the new station with means practically to eliminate these two constituents from the water.

THE WELLS

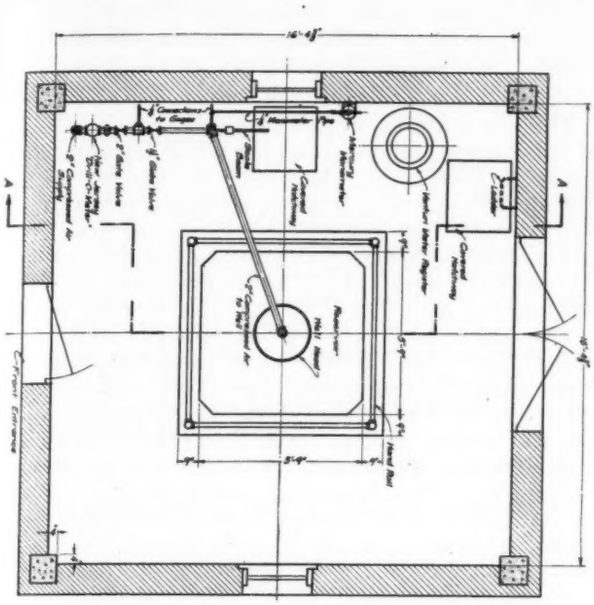
Whereas the present wells are widely



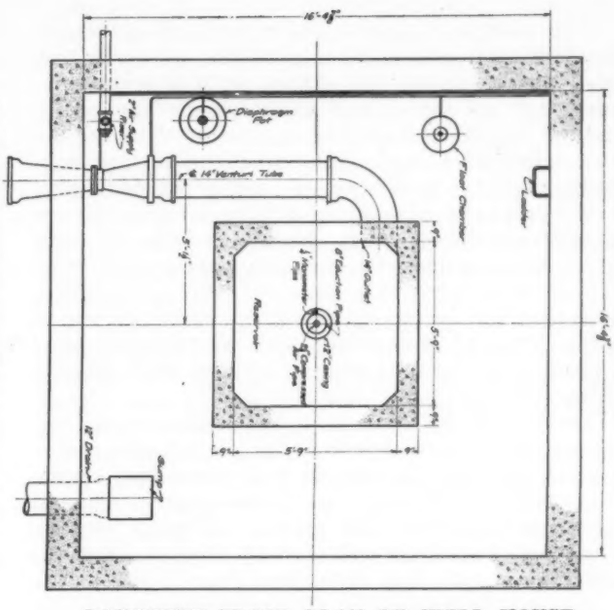
FRONT OF PUMPING STATION.



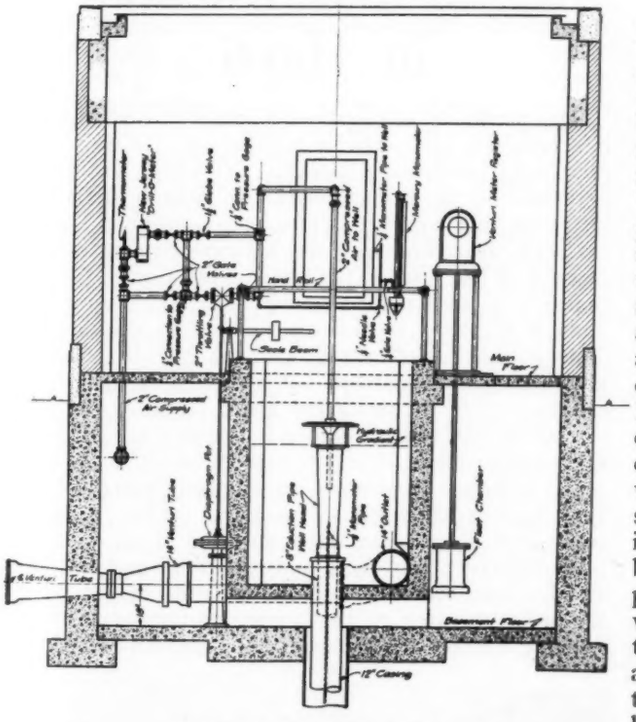
FRONT OF IRON REMOVAL PLANT.
Tower in center encloses wash-water tank.



MAIN FLOOR PLAN OF WELL HOUSE.

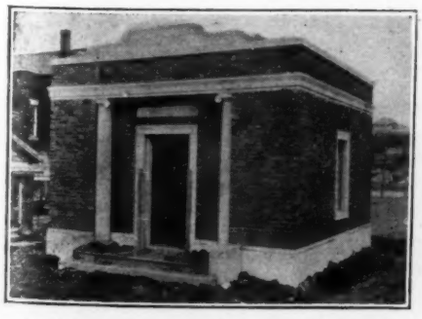


BASEMENT FLOOR PLAN OF WELL HOUSE.

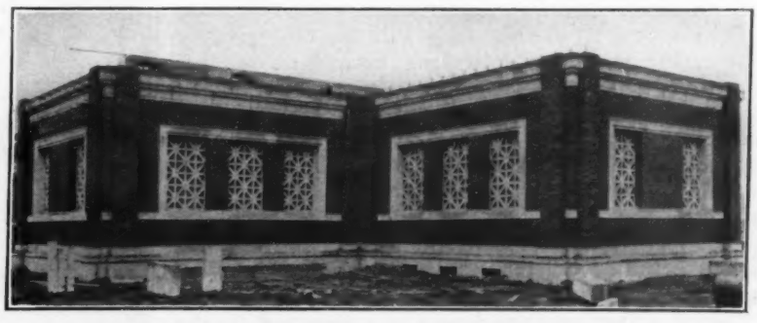


SECTION ON THE LINE AA.

scattered, it is proposed in the new works to take the supply from a relatively small underground area. This will naturally cause more interference between wells than at present, but this will be more than offset by the economy of having a single treatment plant and pumping station and short lines connecting these to the wells. Twenty-three wells will be provided and are expected to furnish an average daily consumption of 18,000,000 gallons and a maximum consumption of 24,000,000 gallons, which quantities are made the basis of the design of the station and treatment plant also, after making allowances for reserve apparatus. The average depth of well will be about 475 feet. The casing will be 12 inches diameter and the upper hundred feet of each will be jacketed with an 18-inch casing carried down to an impervious stratum to provide a double safeguard against the entrance of surface water. The eduction pipes will be 7½-inches diameter and in the center of these will be air pipes of 2¼-inch casing. Each eduction pipe will discharge into an open concrete tank where air and CO_2 may escape. From this tank the water will pass through a Venturi meter and a branch pipe to a gravity collecting main. The tops of the eduction pipes will be set to a fixed hydraulic grade rising from the main station.



FRONT OF A TYPICAL WELL HOUSE.



AERATOR BUILDING DURING CONSTRUCTION.
Shows grill work windows for free circulation of air.

The pumping station and treatment plant are located upon a 10-acre site at the westerly end of a pretty residential street with a wide central mall of grass and shrubbery. The wells extend eastward from the station in a line about two miles long, four being upon the station site, fourteen upon residence lots along the parkway, and five at the easterly end upon a right-of-way paralleling the railroad. Because of the location along this residential parkway, each well head will be covered with a house of neat appearance, the exterior being of mat-faced brick trimmed with Bedford limestone, and the ground surrounding it will be neatly sodded and planted with shrubs.

Over each well will be a well house containing a basement in which will be placed the meter tube, controller diaphragm and meter float chamber and which will be permanently drained through a 12-inch tile sewer. When a well is overhauled (which will probably be at intervals averaging not less than six years apart), the sand and water will be discharged into one side of the basement and drain away through this tile, thus concealing the unsightly litter that ordinarily accompanies such operations. When it is necessary to remove an eduction pipe for repairs, this will be done by means of a portable derrick set upon the roof. For this purpose a slot 30 inches wide and extending the full depth of the house will be left in the roof and provided with a removable sheet-metal cover. The portable hoisting engine used when these repairs are being made will be operated by compressed air in order to minimize the nuisance to the neighbors.

In each house will be meters and gauges and specially designed automatic controllers to regulate the air flow and to prevent waste of air. An operator will be able to note, by stepping inside the door, the rates of air flow and of water flow and the elevation of water in the well, or to change the setting of the controllers.

The water in the wells will be raised to the ground level by air lift, compressed air for which will be supplied by compressors located in the pumping station and carried by pipes which, together with the collecting water-pipes, will be buried in the central mall of the parkway. Compressed air is furnished through four principal mains of 6 to 10-inch diameter, made of steel with joints gas welded except that Dresser sleeves will furnish expansion joints at intervals of 300 feet.

The water from the wells will flow by gravity through a cast-iron collecting main to a receiving or equalizing basin at the station. Here centrifugal secondary pumps will raise the water about 25 feet to the aerator, where practically all of the CO_2 then remaining will be removed. From the aerator the water will pass by gravity through the iron removal plant, which is simply a set of ordinary rapid sand filters, and the finished product will then flow to the suctions of the high-service pumps. A 10,000,000-gallon filtered water storage basin is connected to the conduit supplying the high-service pumps and will provide reserve storage for fires and hourly peaks.

PUMPING STATION

The illustrations show the general appearance of the station buildings, which were designed by Jones & Furbringer, Memphis architects, with the idea of securing a good appearance without extravagance or without sacrificing utility. It is expected to beautify the grounds and to place six public tennis courts upon the roof of the storage basin.

The main part of the pumping station is 225x125 feet, with a rear wing for a shop and a front wing for the office. The south end of this station will contain four 350-horsepower horizontal water-tube boilers, with underfeed stokers and complete mechanical coal and ash handling equipment. The operating steam pressure will be 200 pounds with a superheat of 75 to 200 degrees.

(To be continued)

Road Construction in Hayti

The presence in Hayti of United States forces has resulted not only in stabilizing the government and preventing internal disorders, but also is resulting in public works of which little is heard in this country. The accompanying illustrations show highway work being conducted in charge of the United States Marine Corps, Commander A. L. Parsons being the chief engineer. This is a gravel road with rolled dirt shoulders. The gravel is obtained from a pit by hand-shovelling and carried by wheelbarrows to a crusher. The gravel runs about 15% sand and the whole material is placed in the crusher, which is so adjusted that when run through a screen with 1-inch circular openings not more than 10% passes through as tailings. The crusher turns out about 4 cubic yards per hour.

A concrete pit was constructed under the crusher and elevator and the crushed material is lifted by elevator to the screen and the material passing the 1-inch openings drops into a portable

GRAVELING THE SCARIFIED ROAD SURFACE.

bin. In order to eliminate dust, a canvas canopy was built over the bin as shown. The crusher is operated by a Farquhar 20-horsepower steam tractor, one of the front wheels of which was removed because it interfered with the drive belt.

In constructing the road, it is first scarified and the large stones raked out. The gravel is then placed and brought to a crown with a road form, the ditches being dug and shoulders built up. The road is then rolled thoroughly with a 10-ton roller. In addition to the steam tractor, the plant includes two Reliance portable stone crushers with folding elevators, the crushing plants and the tractor being furnished by the Universal Road Machinery Company of Kingston, New York, to which we are indebted for these photographs and information.

Raising a Heavy-Traffic Street

West street, New York, is a marginal thoroughfare adjacent to North river and from Cortlandt to Duane street is bounded on the west by ferry, railroad and steamship slips, and on the east chiefly by commission stores, markets and some other business buildings. In this locality it is about 200 feet wide and carries an extremely heavy traffic of taxis and automobiles, including large numbers of heavy trucks. It is also crossed at street intersections by great numbers of commuters going to the various ferries. On the east side of the street there were two disused street-car tracks.

The surface of the street, which was paved with granite blocks, is only a short distance above mean high tide and was pitched from both sides downward to the center line, where there were inlets to an old egg-shape brick sewer about 3 feet in diameter. The center of the street was so low that water would occasionally back up through the sewer inlets and stand on the pavement in the center of the street.

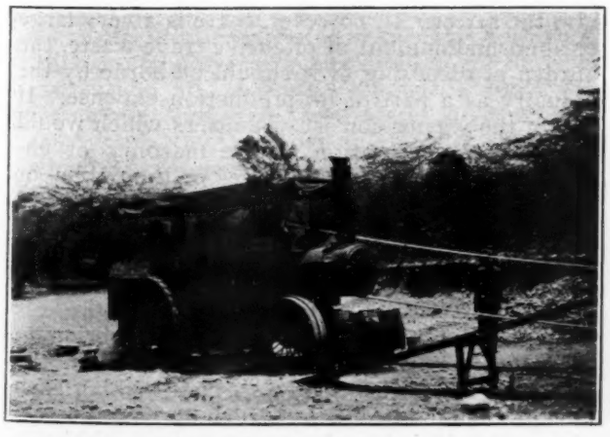
To remedy this condition, a new system of drainage has been adopted, the street being changed from a dished to a crowned cross-section and catch-basins and inlets being provided at both curbs. The new surface is being paved with granite blocks, and catch-basins, curbs and some sidewalks are being built.

The contract for this, approximating $500,000, was awarded to the Asphalt Construction Company, which commenced operations in April and completed the work in December. The principal quantities involved are: about 25,000 cubic yards of fill, 9,000 cubic yards of concrete foundation 6 inches thick, and 47,000 square yards of new granite block pavement; besides a line of 12 to 16-inch cast-iron sewer pipe along the east curb.

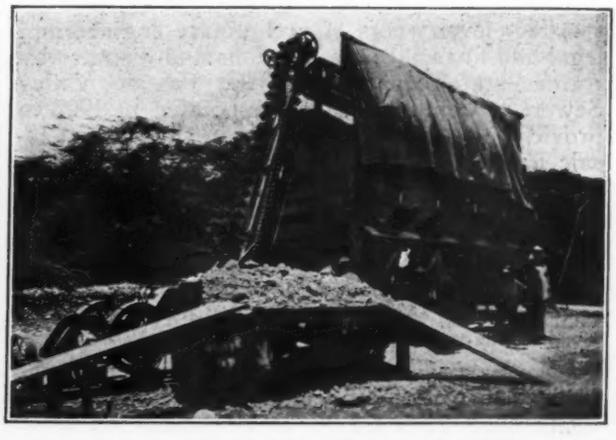
A strip about 20 feet wide along the east side, where the surface tracks ran, required a small amount of excavation, which was satisfactorily done with a Fresno scraper. Elsewhere the original surface was generally left undisturbed except where the granite blocks were considered worth removing and redressing for sale by the contractor and where the old center line sewer was exposed, broken up and backfilled to make a solid roadbed.

Operations were commenced on the east side of West street at Cortlandt street, and the grading and fill of the street were carried on in three successive longitudinal strips so as to leave about two-thirds of the original width of the street open for traffic, which was shifted successively from the old to the new pavement as the work progressed. The final strip of the improvement, on the west side of the street, was executed in alternate, transverse sections, running from the completed longitudinal sections up to the pier and ferry slips and always providing access from one side of a slip before it was removed on the other side.

The fill, which varies from about 1-1/2 to 4-1/2 feet and has an average depth of about 3 feet, consists chiefly of earth and sand from building excavations nearby, and was trucked to the site and placed in position, or piled on the finished or unfinished pavement, according to the condition of the work and the supply, which varied from 0 to 100 truckloads daily. The fill was spread in layers, watered, and thoroughly rolled with a 10-ton Kelly-Springfield steam roller.



TRACTOR ENGINE OPERATING PLANT. BURNS WOOD CUT AT THE SITE.



CHARGING PLATFORM, CRUSHER, ELEVATOR AND BIN.

The subgrade was covered with 6 inches of concrete mixed in a 2-bag Koehring paving machine, which averaged about 100 square yards per hour, notwithstanding the limited space and interruption from congested traffic. Broken stone supplied by the New York Trap Rock Company, sand from Brooklyn, and Portland cement in bags, were delivered by truck and piled in the street. The stone was dumped in long, continuous piles, and afterwards handled by a Barber-Greene loading machine, mounted on caterpillar traction, having a measuring box suspended from the top of its elevator arm. Sand was shovelled by hand into one compartment of a 2-wheel, 1-horse cart, which was then hauled under the stone loading machine and received in the other compartment the quantity of stone required for one batch of concrete. The cart was then hauled a very few feet and dumped into the charging hopper of the mixer.

Considering the enormous amount of heavy truck and taxi traffic carried by this street, and that it was filled to a maximum depth of 4½ feet before paving, the interruption to traffic was not very serious, although two traffic police at each corner had their hands full during the busiest hours.

Cement Bids for Indiana Roads

It is reported that for the first time since the Indiana State Highway Department began building concrete roads it has apparently received actual competitive bidding on cement, bids on November 15 for 1,500,000 barrels ranging from $1.65 to $1.82 a barrel at the mills, seven companies bidding. In 1923 the prices bid were from $1.60 to $1.75.

Passaic Valley Sewer

Nearing completion after twenty-seven years of investigation, litigation and construction. Further action for removal of trade wastes necessary.

After eleven years of preliminary engineering, legal and financial investigations and disputes by former state commissions, the Passaic Valley Sewerage Commission was appointed in 1907 to provide for sewering the cities in the lower Passaic River Valley, and the date of December 31, 1912, fixed as that beyond which there should be no discharge of polluting materials into that river. This date has been advanced from time to time and the intercepting sewer has been under construction during a large part of the sixteen years. William Gavin Taylor, deputy chief engineer of the commission, reported recently that the sewerage works are nearing completion, the principal unfinished item being the tunnel beneath New York Bay. On November 15, when Mr. Taylor wrote, there were two gaps to be completed, one of 80 feet between the bay shaft and the shore shaft and the other of 1,350 feet between the bay shaft and the terminal chamber. On November 20 the former gap was closed, the two compressed air shields meeting with a difference of alignment of 3 inches horizontally and less than an inch vertically. It was believed that about 12 weeks more would see the entire completion of the boring of the tunnel to the terminal chamber.

The total length of the tunnel is about 9,300 feet. Construction of it was begun several years ago, but the contract was abandoned first by one contractor and then by a second and the tunnel is being completed by the commission under the direction of its chief engineer, J. Ralph VanDuyn. Work is being prosecuted continuously with three shifts a day. About 70 feet a day of progress was being made a short time ago and it was expected that this would be increased to 90 feet or more by additional facilities which were being provided.

The commission's engineers expect that sewage can be diverted from the river before warm weather next year. The approach of this event makes it desirable to emphasize the fact that this sewer alone will not effect complete or even very considerable purification of the Passaic river. While this river receives the unpurified sewage of most of the municipalities in its drainage area, the most objectionable part of the pollution in its lower stretches is due to liquid wastes from silk dyeing and other plants. The statute provides that the sewer shall receive domestic sewage, but not more than 10 per cent of the factory wastes. In designing the sewer allowance was made for a total volume of 60,640,000 gallons of trade wastes daily, which is about 20 per cent of the capacity of the sewer. The statute, however, also provides that it will be unlawful to discharge polluting matters into the river and the commission is empowered to enforce this provision. Much of the waste waters consist of condensing, cooling and wash waters, which are not considered polluting, and, if kept separate from the other wastes, could be discharged directly into the river.

Where the polluting waste is not large it may, under the 10 per cent provision, be discharged into the sewer. If, however, there is a very large or abnormal amount of offensive trade waste, the burden of disposing of it should be borne by the industry as a part of its production expense. If any of the wastes consist of matters which would result in disintegration of the masonry or endangering the lives of employes or the public, or otherwise injuriously affecting the integrity and usefulness of the sewer (such including gashouse wastes, strong acids, gasoline, live steam, etc.), the discharge of these into the sewer will be prohibited.

The commission is at present endeavoring to secure co-operation of all the industries in the Passaic Valley with a view to their making such changes and introducing such processes and plants as will bring about the desired withholding of pollution from the Passaic river after the

Spring of 1924. The Nutley Rotary Club has taken up with the various Rotary clubs in the Passaic Valley district the subject of securing co-operation of the manufacturers with the Sewerage Commission in securing this result.

Building North Beach Sewers

Adjacent large storm water and sanitary sewers built in deep open trench rapidly excavated by dragline and clamshell buckets and sheeted at bottom only. Duplicate concrete plant, mixers shifted every 120 feet by traveler derrick, concrete spouted 60 feet, making average of 10 feet of sewers in 8-hour shift.

By Frank W. Skinner

The outfall section of the North Beach Sewer, now under construction by Booth & Flinn, Limited, for the Borough of Queens, New York City, Captain James Rice, engineer, consists of two adjacent reinforced concrete conduits with vertical walls, flat roof slabs and arched inverts. The sanitary sewer is 9 feet 9 inches wide and 8 feet high and the storm sewer is 14 feet 7 inches wide and 8 feet high, inside dimensions. Together they contain about five yards of concrete and 250 pounds of reinforcement steel per lineal foot, require an average excavation of about 40 yards per lineal foot of sewer, and will use a total of about 36,000 bags of Atlas cement in the 6,000 yards of concrete.

The contract section adjacent to the screen chamber at the outlet, which is 1,475 feet long, was commenced in April, 1923, is now more than 80 per cent completed and it is expected will be finished this season at an estimated cost, based on unit prices and specification quantities, of about $500,000. The work is being executed by ordinary methods and an abundant installation of standard equipment and presents interesting features of organization, balanced schedule and adjustment of operations that secure continuous satisfactory progress. The rapid and economical excavation of difficult material, controlling treacherous soil and large water flow, and the smoothness and efficiency of the concreting which advances with speed and uniformity, insure steady progress with a comparatively small force.

EXCAVATION

About three-fourths of the excavation is accomplished by a steam drag-line machine with caterpillar traction and 40-foot boom operating a ¾-yard Page-Lidgerwood dragline bucket that digs the trench 35 feet wide to a depth of 24 feet, handling earth, clay, gravel and boulders at an average rate of 300 yards per day. About one-fifth of all the excavated material is dumped alongside the trench on both sides, whence it is eventually reclaimed for backfill.

After the dragline bucket has excavated to its limiting depth of about 24 feet the trench is continued to a maximum depth of 41 feet by excavation with two ¾-yard Hayward clamshell buckets that dig efficiently and fill well, leaving little or no hand digging or trimming above or below water level.

The material not reclaimed for backfill, about 44,000 yards in all, is dumped directly by the dragline and clamshell buckets into three 5-ton trucks that haul it about a mile to the spoil bank. Although the buckets sometimes dump from a height of several feet, the heavy truck bodies endure the impact and the hydraulic hoist and automatic opening and locking of the tail boards make for easy handling of the spoil.

SHEET PILING

The clay and gravel stand well with very steep sides to the trench, but the dry sand below them is very unstable and is sheeted with 3x10-inch square-edge planks 24 feet long driven as the excavation advances by two No. 5 McKiernan-Terry sheeting hammers, one of them handled by a small traveling stiff-leg derrick with 20-foot boom that is mounted on trucks running on two narrow gauge tracks carried on a light trestle, built on the slope of the excavated material. The derrick boom is operated by a single-drum Lidgerwood hoisting engine.

The sheeting is easily driven, without much injury, to a depth of two or three feet below subgrade by one hammer on each side of the trench, both operated by steam from the boilers serving the hoisting engines and driving the sheet piles much more efficiently and economically than could be done by hand, requiring only one man to handle the hammer for a short time at intervals to keep the treacherous material confined and exclude much of the ground water.

The sheet piles are pulled by the derricks or steam shovel as the trench is back-filled, to be redriven, so that a section of sheeting about 120 feet long suffices. Many boulders, some of them of one yard or more, are encountered and are handled with the clamshell and dragline buckets without blasting.

GROUND WATER

Considerable difficulty is had with numerous large springs encountered in the bottom of the trench, the water from which is chiefly handled by two Domestic diaphragm gasoline pumps with 4-inch suctions, each with a capacity of about 150 gallons per minute. When bad leaks occur the water is collected in sumps, the bottom is excavated in small bulkheaded sections if necessary and the pumps are easily set on or near the bottom and operated continuously or intermittently until the invert has been laid and the leaks sealed, the discharge being delivered at the surface of the ground against a maximum head of about 40 feet.

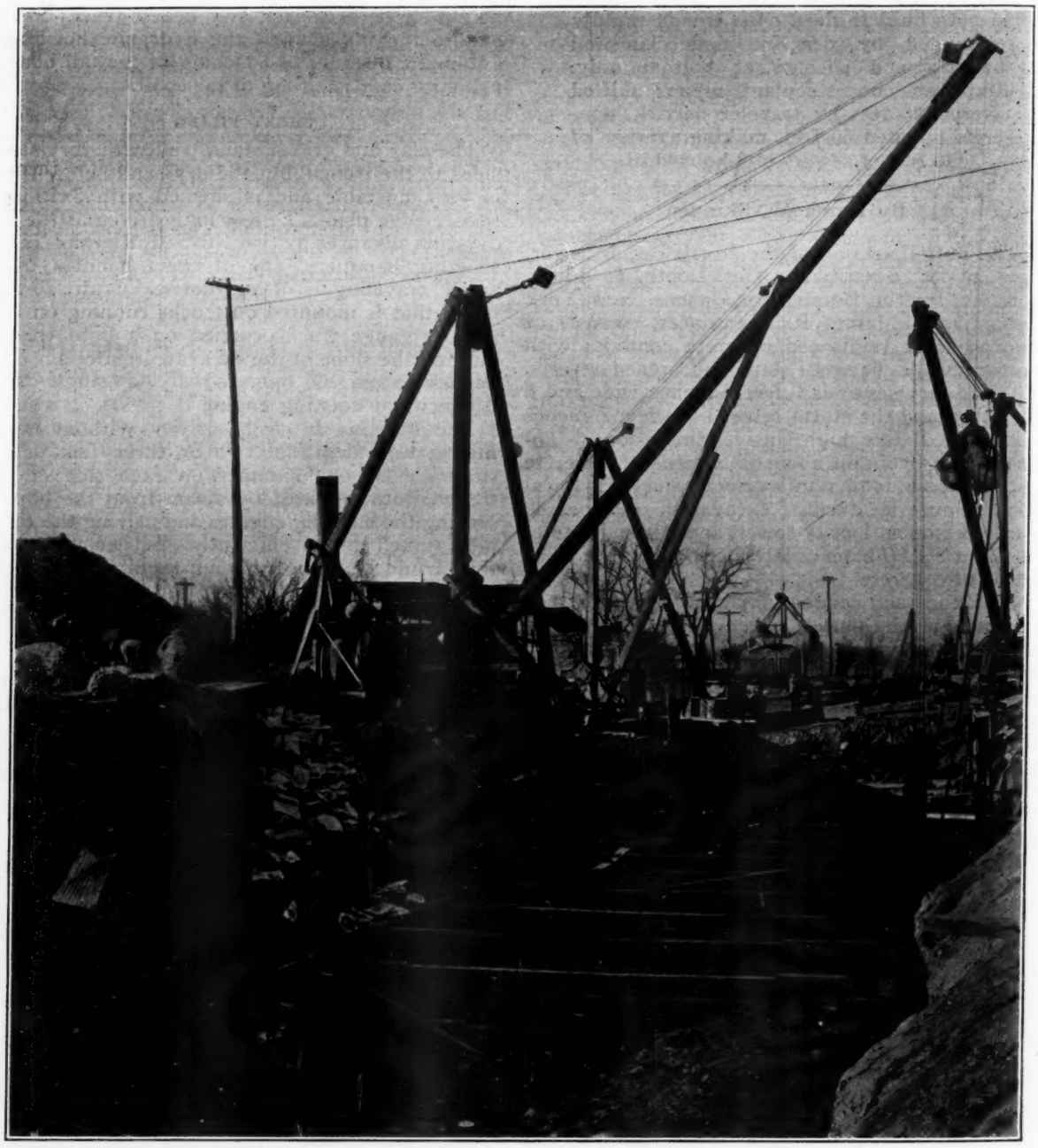
Ordinarily one of the pumps is installed on the large traveler. Usually the water is handled by

one diaphragm pump operated during the 8-hour day shift, and one electrically driven, automatically controlled centrifugal pump with a capacity of 500 g. p. m. operating as required during the 16-hour intervals between day shifts. Pumping is maintained for 24 hours continuously after each section of invert has been laid.

FOUNDATIONS

In good sand the bottom is excavated to subgrade level, trimmed and the concrete invert laid directly on the sand. For about half the length of the sewer, however, the invert is in clay ground, and here transverse bents of five piles about 25 feet long are driven 5 feet apart longitudinally. Wales are bolted to both sides of them and support a plank platform, beyond which the pile tops project about 6 inches into the invert concrete, which is placed on the platform in sections 30 feet long.

The piles are driven at a rate of about 200 or 300 lineal feet per 8-hour shift by a steam hammer suspended from a derrick boom and generally driving to required elevation without cut off. On account of the nature of the ground the trench is open only a short distance beyond the



BUILDING NORTH BEACH SEWERS.
Traveler on cribbed track alongside deep trench. Concrete mixer served by wheelbarrows and spouting to forms. Excavating and backfilling by derricks. Sheeting hammer suspended from boom of small derrick on the right side of trench.

concreting, so that the piles cannot be driven far in advance and, as waiting for the driving sometimes tends to delay the work, it is done with maximum rapidity.

The sheeting is braced by three tiers of 12x12-inch transverse struts, 12 feet apart longitudinally, that engage 12x12-inch wales against the sheeting. The lowest row of struts is shifted as necessary to clear the forms and the concrete.

CONCRETING

In constructing each of these concrete sewers use is made of six 5-foot sections of standard Blaw-Knox collapsible steel forms, mounted on wheels, which are slacked off, moved forward and set for another section in two hours by a 5-man gang. The forms are light, strong and simple, the adjustments are quickly and accurately made, and they give regular finish to the concrete surface.

Broken stone, sand and cement are delivered by trucks and stored in piles alongside the trench. The aggregate is delivered by wheelbarrows from the stock pile to the adjacent ¾-yard mixer, which discharges into a 3-section steel chute delivering to the forms at a maximum distance of 60 feet in either direction from the mixer and completing a 30-foot section of walls and roof slabs in six hours. A duplicate mixer is maintained in reserve to prevent any interruption to the work through accident or repairs to the mixer.

As the work progresses the mixer is moved forward 120 feet each time by a 70-foot derrick boom of 10 tons capacity, which is installed on one corner of a traveler platform moving on the 30-foot gauge track, laid on cribwork alongside the trench.

DERRICK SERVICE

The main traveler handles timber, boulders and one of the ¾-yard clamshell buckets, which has to excavate and backfill. It is supplemented by a stiff-leg derrick and clamshell bucket on the opposite side of the trench.

The main traveler and the traveling derrick on the opposite side of the trench are each equipped with a 3-drum Lidgerwood hoisting engine which develops ample power for rapid hoisting with excess adequate for the more severe work of forcing the large clamshell bucket lips into the dense material and filling and closing the buckets. One of the derricks has also a Lidgerwood and the other derrick has a Dake swinging engine. Below the dragline excavation the sand is excavated at the rate of about 150 to 200 yards per day, and backfilled by the clamshell buckets at the rate of about 100 lineal feet of sewer in 6 days.

The concrete gang lays a 30-foot section of invert in 7 hours. Backfilling is commenced after the sewer has been completed from 7 to 10 days. The concrete is three parts Atlas cement, four parts sand and eight parts broken stone. The reinforcement steel is bent by hand at the site. Excavation was commenced at the opposite ends of the section, but concreting has been done from one end only.

The work progresses at an average rate of 5 lineal feet per day with a force of about 35 men under the direction of W. Griff, superintendent for the contractor.

Concrete Underdrains at Worcester

Failure of underdrains in sand filters, possible causes of which are suggested as organic acids from the soil, acidity of sewage, or putrefaction in the filter.

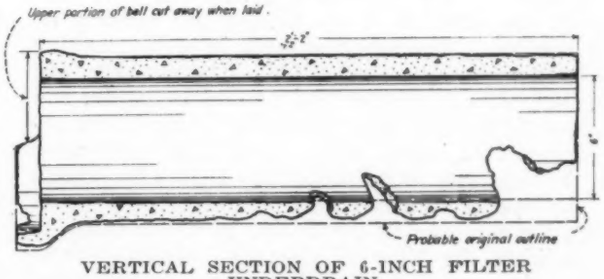
By Harrison P. Eddy *

Beginning in 1898 the city of Worcester, Massachusetts, began the construction of sand beds to be used for purifying the sewage by the process commonly known as intermittent filtration. The aggregate area of such beds at the present time is 67.61 acres net filtering area, the largest plant of this type in the United States.

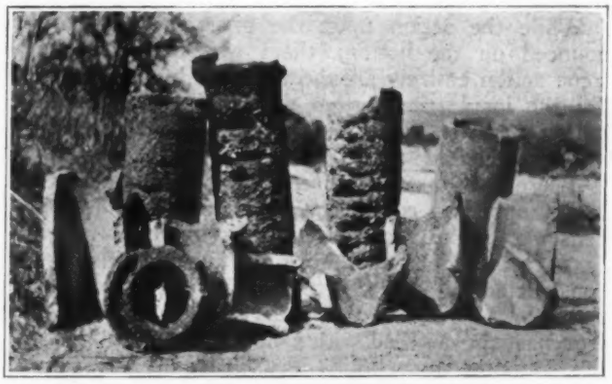
The sand in these beds varies from 3 to 5 feet in depth, and is divided into units approximately one acre in area. The beds are provided with underdrains spaced approximately 35 feet apart. In the earlier years the drains were constructed of precast cement-concrete pipe laid with open joints and surrounded with graded gravel over which the sand was placed. Approximately the upper two-thirds of the socket of the pipe was broken off, the bottom third being retained in order to furnish a bed for the contiguous pipe.

When in use, the beds are flooded to a depth of

*Of Metcalf & Eddy, Consulting Engineers, Boston.



VERTICAL SECTION OF 6-INCH FILTER UNDERDRAIN.



CEMENT PIPE TAKEN FROM UNDERDRAINS OF SAND FILTERS AT WORCESTER.

3 to 6 inches at intervals of 1 to 3 days, depending upon the condition of the bed, the character of the sewage and the weather. The sewage percolates downward and laterally through the sand to the underdrains, into which it enters through the open joints, and thence flows to the main effluent channel. When in good working condition the bed drains rapidly, the flow of effluent practically ceasing within two or three hours from the time the bed is dosed. From this time until the next dose is applied, the bed is allowed to stand empty, for the purpose of aeration and oxidation.

The cement-concrete pipe used for underdrains was made of Portland cement, sand and fine gravel, thoroughly tamped into molds by hand. The proportion of water used in the mixture provided what would be termed a relatively dry mix.

The sewage contains spent pickling liquids from wire drawing establishments, foundries and other metal works; together with industrial wastes from tanneries, carpet mills, woolen mills and other industries.

The sulphate of iron contained in the spent pickling liquid is oxidized during its passage through the filters, and a substantial proportion of the iron is precipitated in the pores of the beds, particularly in the gravel surrounding the underdrains. This iron, commonly in the form of ferric hydrate, clogs the pores in the gravel and effectively seals the underdrains, so that from time to time it has been necessary to dig them up and relay them.

When the cement-concrete pipe was removed it was discovered that it had been seriously disintegrated, as illustrated by the photograph and drawing. It was found that the action was chiefly at or near the bottom of the pipe, forming grooves transversely, having an alignment similar to a spiral, with the grooves about 2 inches apart center to center. The alignment of the grooves suggests that they followed the direction of the placing and tamping of the concrete. The pipe was made in molds standing on end with the socket down. The concrete was introduced in a more or less continuous stream and constantly tamped, thus producing spiral layers approximately 2 inches thick. A possible explanation of the regularity of the action may be that the bottom of the layers of concrete were somewhat more porous than the top, due to the failure of the tamping to consolidate the layer of concrete uniformly from top to bottom of the spiral band which was about two inches thick.

While the action upon the pipe was very pronounced on the bottom, there was in most cases some action entirely around the outside of the pipe. On the inside the bottom was slightly roughened, but in some cases the top was as smooth as when originally contructed.

There appear to be three possible causes of the action upon the concrete, *First*, many of the filter beds were built upon a shallow layer of peat—roughly 2 feet in depth. Before the underdrains were constructed, however, trenches were excavated through the peat to the underlying sand. These trenches were refilled with sand and the pipe laid in it. Thus the underdrains were at a lower elevation than that of the normal surface of the peat. They were also practically at the elevation of ground water, so that after the effluent had entirely drained out of the sand, the pipes were generally in contact with the ground water. It is possible that this water may have absorbed from the soil organic acids which attacked the cement and caused the destructive action.

A *second* explanation is that the acid in the sewage attacked the concrete. The spent pickling liquids from the wire mills are discharged in relatively large quantities at intervals during the day. The acidity imparted to the sewage, on the average amounted to 75 parts per million (equivalent to 0.008 per cent), expressed in terms of sulphuric acid. The acidity of the sewage during the brief periods when it contained heavy doses of spent pickling liquors was probably as high as 500 parts per million (equivalent to 0.05 per cent). The disintegration of the cement-concrete pipe may have been due to the direct action of the acid upon the concrete.

A *third* possible explanation is that the disintegration was caused by putrefactive conditions within the filters. The volume of sewage applied to the beds was such as to overload them and occasionally, particularly during the winter and spring, putrefaction took place to such an extent that the sand at the bottom was frequently black, due to sulphide of iron formed in the pores of the filter. This may have been due in part to the sulphur naturally present in all sewages, but probably it was increased by the sulphates from the pickling liquors. When the beds were found to be in this condition the application of sewage was suspended, thus affording an opportunity for oxidation to take place in the beds. This resulted in oxidizing the sulphide of iron and changing the color from the black to the normal brown of the sand. This oxidation doubtless resulted in the formation of small quantities of relatively concentrated sulphuric acid, which may have been responsible for the action upon the concrete.

Whatever may have been the cause of the chemical action upon the cement-concrete pipe, it is important to recognize that conditions were such as to cause destructive chemical action. If the action was due to acids originally present in the sewage, it is worthy of note that the acid was present in sufficient quantity to offset the natural alkalinity of the sewage, as well as that contributed by industrial wastes such as that from the tanneries; and yet was present in extremely small quantities expressed in parts per million or percentages.

Standard Specifications for Cast-Iron Pipe

Although standard specifications of the New England and American Waterworks Association for water mains have been used for a number of years, the American Engineering Standards Committee believes that much remains to be done in standardizing specifications for cast-iron pipe for other uses, and at a meeting on October 4th attended by representatives of many users as well as by the Committee it was decided that it should endeavor to obtain further action along these lines. Specifications were submitted by the American Gas Association, the American Society for Testing Materials and others. It was

decided to authorize the chairman of the A. E. S. C. to call a conference on the subject which would consider soil pipe and other light types of cast-iron pipe as well as pipe flanges and fittings for high pressure work. The Committee decided that it was desirable that the subject be considered by a committee fully representative of all those having an interest in it.

The committee referred to was broadly representative, those present and the group represented by each being as follows: S. G. Flagg, Jr., American Society of Mechanical Engineers; F. A. Barbour, American Waterworks Association; F. A. McInnes, New England Waterworks Association; A. H. Hall and W. Forstall, American Gas Association; F. F. Schauer, Natural Gas Association of America; C. D. Young, American Society for Testing Materials; R. Toensfeldt, American Society for Municipal Improvements; H. Kelly, Associated General Contractors of America; J. C. Meloon, National Automatic Sprinkler Association; E. A. Barrier, Fire Protection Group; A. W. Claussen, Underwriters Laboratories; and W. G. Hammerstrom, N. F. S. Russell and W. Wood, representing foundry companies.

The A. S. M. I. Convention

Business proceedings, papers read, and discussions thereof at the annual convention in Atlanta, Georgia, last month. Membership increased during the year and finances in better condition.

Owing probably to the distance from the northern and north central sections of the country, where the majority of the membership of the American Society for Municipal Improvements is located, and partly, perhaps, to the change made during the year in the place of convention, the attendance at the Atlanta, Georgia, convention November 13 to 16 was not as great as that at most of the recent conventions, there having registered about 90 active members and 60 associate members. The meetings, however, were well attended and the officials and citizens of Atlanta seemed to take more real interest in the enjoyment and entertainment of those present than have several of the cities where the conventions have been held recently.

The business of the convention opened with the meeting of several of the specifications committees in the afternoon and evening of Monday, and the meeting of the Executive Committee. The only business of importance reported by the Executive Committee was the recommendation (which was later approved by the convention) that the constitution be so changed as to place the selection of the place of meeting for future conventions in the hands of the Executive Committee, the decision to be made and announced to the membership not later than the first of April immediately preceding the convention. This recommended change from the practice of naming places of meeting from the floor or of deciding by vote of the convention on a report from a special committee will be submitted to letter-ballot of the membership. The Executive Committee at this meeting admitted 23 applicants for active membership, 11 for associate and 4 for affiliated.

On Wednesday the Nominating Committee presented its report, placing in nomination the following: For president, E. R. Dutton of Minneapolis; first vice-president, E. L. Dalton of Dallas; second vice-president, T. Chalkley Hatton of Milwaukee; third vice-president, C. A. Poole of Rochester; finance committee, William A. Hansell, Jr., of Atlanta, George F. Fiske of Buffalo and G. J. Requardt of Baltimore. These were unanimously elected to the several positions.

TUESDAY SESSIONS

The formal meetings of the convention opened at 10 o'clock Tuesday morning with an address of welcome by Mayor Walter A. Sims, a response by First Vice-President E. R. Dutton, and the annual address by the president, W. W. Horner. Two of the points emphasized in Mr. Horner's address were a recommendation that this society co-operate with other societies where such joint action would seem to be profitable, and that one of the matters on which such joint action seemed desirable was that of a more equitable and wise form of contract for public work.

Following the report of the Executive Committee narrating the actions above referred to, and also the fact that the Executive Committee approved of the action of a committee of the society in agreeing upon a reduction of the number of sizes of brick and of varieties of asphalt which will be recognized as standard, the secretary read his report. The figures covering membership showed that of the active members 73 had been lost during the year and 94 admitted, leaving 521 on October 1; 9 affiliated members had been lost and 7 admitted, leaving a total of 30; 25 associate members had been lost and 20 admitted, leaving a total of 126; the net gain of all classes of membership during the year having been 14 and the total membership on October 1, 677. The secretary's financial report showed that $3,238 had been received as dues from active members, $187 from affiliated members and $1,436 from associate members; $389 from sale of proceedings, $13 from sale of specifications and $516 from advertisements; while $46.46 had been re-

ceived as interest on bonds and bank deposit. In order to meet a deficiency in finances of the previous year $500 of Liberty Bonds had been sold. Disbursements had amounted to $6,433. There was a balance of about $45 in bank and $1,000 in Liberty Bonds. Of the disbursements, the cost of the convention had been $1,213; publishing proceedings, $3,524; office, clerical and miscellaneous, $1,213; secretary's salary, $300, and $110 for expenses of committee and officers.

Committees on Nominations and Resolutions were appointed and the proposed amendment to the constitution was introduced.

The Committee on Public Safety reported through Mr. Becker, in the absence of Chairman Chaussê, that it was at work upon a report that would be ready at the next convention. For the Committee on Public Welfare, Jefferson C. Grinnalds reported that the committee had decided upon the plan of dividing the subject assigned to it into five heads and devoting one year to each of these during a 5-year cycle. H. F. Bascom had reported last year on "Baths and Comfort Stations" and this year the subject of "Markets" was reported upon. Mr. Grinnalds expressed the opinion that the location of markets was one that should be considered by city planners as a subject that was decidedly within their province. The market should be located in a local business district, but not on the highest priced land. Several members discussed the report; St. Louis, Baltimore, Allentown and others reporting that farmers took advantage of the markets for the sale of personally grown produce, those in Allentown, however, using private lots for their market stands. E. A. Fisher stated that in Rochester the markets were used almost exclusively for wholesale rather than retail business.

The afternoon session opened with the report of the Committee on Waterworks written by George W. Fuller and in his absence read by the secretary. This report gave briefly a review of recent developments in this branch of public utilities. A paper by John R. Baylis, entitled "Let Us Have More Palatable Drinking Water," was read by the secretary, the principal point made by Mr. Baylis being that, as the public has become more particular in its food, streets and all other features of modern life, it is entitled to be more particular in its water also, and that not merely as to its safety but also to its palatableness and general agreeableness. A paper describing "The New Water Supply Works at Memphis, Tennessee," whose author, J. R. McClintock, also was absent, was read by F. G. Cunningham. This described in detail the plans for extending the use of well water in this city and treating it so as to make it more wholesome, less hard, etc. Harrison P. Eddy discussed "Possible Causes of Failure of Cement Concrete Pipe Used for Under Drains in Sand Filters at Worcester, Massachusetts." This and the previous paper will be found elsewhere in this issue. There was no discussion of any of these papers.

In order to accommodate the author, Robert Whitten, his paper, entitled "Zoning Plans for Atlanta," which was down for Friday morning, was read at this session and was discussed by Messrs. Horner, C. C. Brown and others. Mr. Grinnalds stated that the planning in Baltimore provided for race segregation, certain sections being assigned exclusively for whites and other sections exclusively for negroes. The legality of this had not yet been passed upon by the courts, but as restrictions were placed upon each race from encroaching upon the districts set aside for the other and there was no unjust discrimination as to the topographical desirability of the assigned districts, he did not see why it should not be held as legal.

Two moving pictures concluded the session, one showing "How Bridgeport, Connecticut, Salvages Its Wornout Pavements" and the other showing at great length the manufacture and various uses of fire clay products. The former, by the Texas Company, showed the placing of a 3-inch asphalt wearing surface on an old macadam pavement, 140,000 sqare yards having been laid in 140 days by four gangs of men.

WEDNESDAY'S SESSION

Wednesday morning's session opened with the report of the Committee on Street Lighting, read by Ralph Toensfeldt, chairman. This was a general explanation of recent progress and was followed by two papers on street lighting, one by L. A. S. Wood of the Westinghouse Electric and Manufacturing Company and the other by Stephen Carleton Rogers of the General Electric Company. Mr. Wood described and exhibited the most recent device in connection with a street light unit, the asymmetric refractor, the first installation of which in Chicago was to be put into service on Thanksgiving. This he considered to be the greatest advance in street lighting made in years. Its purpose is to direct a very large percentage of the light in directions up and down the street rather than sideways toward the buildings. In the discussion of street lighting which followed the matter of elevation of light was considered, Mr. Wood recommending from 18 to 22 feet and Mr. Rogers stating that Boston had reduced the elevation of its lighting units from 28 feet to 18 feet. Mr. Grinnalds called attention to the correlation between city planning and street lighting. Referring to magnetite arcs, one member stated that although the current cost for these was less than for incandescent, they cost more for installation and upkeep, and, because of the necessity for a housing of the mechanism, were less susceptible to artistic treatment. Incidentally it was stated that St. Louis is intending to invest $8,000,000 in a new street lighting system.

"Street Lighting Distribution With Purchased Current," prepared by J. D. Bowles, was read by the secretary, in discussing which Mr. Toensfeldt stated that the electric power company in St. Louis prefers to sell the current only and not to furnish the street lighting system, believing that it is more satisfactory for both the city and the company that the former have the lighting system in charge.

The session concluded with an address on "Transportation Problems," by J. D. McCartney, assistant to the president of the Central of Georgia Railroad.

THURSDAY SESSIONS

On Thursday morning E. R. Conant as chairman read the report of the Committee on Street Paving and Street Design, following which, papers on paving subjects were read and discussed. These included: "Widening of Highway Curves," by G. A. Crayton; "Methods of Highway Construction in Georgia," by W. R. Neel; "Relation of Depth of Foundations to Their Strength," by C. D. Pollock; "Some Details in Street Design," by P. L. Brockway; "Modern Construction of Brick Pavements and Why," by Will P. Blair; and "Lime Rock Asphalts of the South," by E. A. Kingsley. Mr. Neel discussed chiefly sand clay roads and their maintenance, this being the type of road most common in Georgia. It is found serviceable under all except the more extreme traffic conditions, one road near Spartanburg carrying a thousand vehicles a day. An instance was cited of a top soil road which had for an unknown period carried traffic over an opening 5 feet wide by 8 feet long where the soil had settled away from the pavement, leaving it to span the depression as a bridge.

Mr. Pollock recommended the substitution, on a clay foundation, of coarse material for additional thickness of concrete base. This paper will be published in this or a following issue. The suggestion of progressive construction of a pavement made by Mr. Brockway was favorably commented on by several members, Mr. Horner stating that he had in one case laid a temporary pavement in a new street knowing that any pavement no matter how good would be cut up by traffic, house connections, etc., while the street was building up, this pavement to be replaced later with a more durable one. In another instance where a street railroad track was to be laid a temporary pavement was placed down the center of the street. Mr. Blair explained why the N. P. B. M. A. had changed its recommendation for filler from cement grout to bituminous.

Thursday afternoon was devoted to reports of specifications committees. F. P. Smith presented some minor changes, chiefly improvements in expression and the addition of definite clauses, in the specifications for bituminous pavements. No changes were recommended in the specifications for brick pavements. George F. Fiske, chairman, stated that a questionnaire relative to the preference between 1:2 grout and 1:3 showed the vote almost equally divided. R. A. MacGregor presented the report of the Committee on Specifications for Stone Block Pavements and John Klorer that of the Committee on Specifications for Wood Block Pavements. The latter recommended the omission of provisions for a sand cushion and the insertion of one for paint coat. E. S. Rankin, chairman of the Committee on Specifications for Sewers, presented a report recommending an important change whereby two divisions of the specifications, one providing for lump sum bidding and the other for unit cost bidding, should be combined, alternative clauses being given under each heading instead of two separate sets of specifications.

Following these reports, a paper by L. M. Fisher, entitled "The Engineer's Responsibility in Fostering Malaria Prevalence," was read by the secretary. This called attention to the various pools and larger bodies of stagnant water caused by embankments for roads, railways, etc., as mosquito breeding places. In discussing this, Mr. Blair recommended the substitution of pipe drains for open drains along highways, since the latter were too often obstructed with vegetation, dirt washed in, etc., and the water pooled up thereby not only bred mosquitoes but kept the subgrade moist.

SEWERAGE AND REFUSE DISPOSAL

Thursday evening's session was devoted to sewerage and refuse disposal. Mr. Hatton presented the report of the Sub-Committee on Sewage Disposal on investigations conducted by various cities and other agencies, including a progress report on the investigations by the city of Milwaukee on the fertilizing value of activated sludge. The main part of the paper was practically the same as the report made in October to the American Public Health Association by a committee whose personnel was practically the same as this, which report was published in the November issue of PUBLIC WORKS." An abstract of the investigation on the fertilizing value of activated sludge will be published in a later issue of this paper. Discussing this subject, Mr. Eddy stated that use of sludge as fertilizer must be, for each city, a local problem and must be accomplished largely through local propaganda. A. C. Decker described methods employed in "Night Soil Disposal at Mining Camps," especially one which consisted in depositing this in tanks and applying water so as to provide the conditions necessary for digestion. Mr. Eddy, in discussion of this paper, stated that this was the only case of which he knew of deliberately making sewage out of night soil, although of course there were numerous instances of dumping night soil into sewers. M. B. Tark referred to the process as essentially one of slude digestion, with which opinion others agreed. The necessity of water to secure digestion was illustrated by Mr. Hommon by citing cases of the army camps in which sludge was buried while wet but without the addition of any other water, and no digestion whatever took place. Mr. Hazelhurst expressed the opinion that the can system would always be desirable in most cities, for the sewerage system could not keep pace with the extension of residence districts into the outskirts of the city.

The most recent developments in connection with the use of the Maclachlan process of sewage treatment at Houston, Texas, were described by J. C. McVea. A final process and apparatus therefor had not yet been evolved, but the experi-

ments appeared to be very promising for ultimate success.

A report by Samuel A. Greeley on "Garbage Disposal in Various Cities" was read by Mr. Poole.

FRIDAY'S SESSION

The concluding session Friday morning opened with the reading of a paper, entitled "Recent Observations on Sewage Disposal Works in Europe," by George W. Fuller, in which he told of conditions in England, Germany and other European countries. Discussing this, Mr. Hatton called attention to the fact that activated sludge appeared to be finding favor with the smaller cities and towns in England; also that the English were not utilizing sludge, although this would appear to be very desirable for the communities of that country. He also referred to tests made of mechanical agitation at Pasadena and expressed the opinion that this method of aeration may prove advantageous for small plants.

W. W. Pollock described "The Valuation of Property for Taxation Purposes" as performed by the Manufacturers' Appraisal Company. G. J. Requardt described "How Baltimore Passed Its Zoning Ordinance," which was followed by a discussion on zoning in which E. A. Fisher expressed the opinion that provision for granting exceptions was an essential element of satisfactory zoning; and Mr. Hatton stated that within the two weeks previous the Wisconsin Supreme Court had handed down a decision upholding the powers of cities to enforce zoning under the police law, thus eliminating the necessity of a state enabling act. In spite of this, however, both Mr. Grinnalds and Mr. Fisher believed that a state enabling act was very desirable. J. E. Barlow, chairman of the Committee on Municipal Legislation and Finance, reported that that committee had been doing considerable work but had no report ready.

The session concluded with reports from representatives of the society in other organizations, including committees C-3 and C-4 of the American Society for Testing Materials, by George F. Fiske and E. S. Rankin, respectively; by A. W. Dow of the Sub-Committee of the American Engineering Standard Committee on Penetration for Bituminous materials; and by G. F. Fiske of the Paving Brick Committee of the Division of Simplified Practice of the U. S. Department of Commerce.

Road Builders' Convention and Good Roads Show

Why everyone interested in highways should be in Chicago during January 14 to 18. The show and the program of the Convention. Where to stop and what to do.

The twenty-first annual convention of the American Road Builders' Association and the fifteenth annual Good Roads Show will be held at Chicago, the convention at Congress Hotel January 15 to 17, and the show at the Coliseum January 14 to 18.

The value of these conventions to contractors and engineers is indicated by the following statements by H. B. Sproul, president of the H. B. Sproul Construction Company of Peekskill, N. Y., and Scranton, Pa., and P. H. Piepmeier, chief engineer of the Missouri State Highway Commission. Mr. Sproul says:

"I attended last year's Road Show at Chicago and am going again if my health will permit. Last year I was accompanied by General Superintendent H. M. Unangst, and we considered the time and money spent was the best investment we ever made as we were able to study different machinery and make a comparison with the different units right before us. We would not miss this year's show for the world."

Mr. Piepmeier says:

"I expect to arrange, if possible, for members of the Commission as well as a few of the engineers from this department to attend the Road Builders' Association meeting in Chicago in January.

"It is needless to say that I am making full plans to be present, as I do not recall having missed a single meeting in the last ten years. My purpose in having the Commission and engineers attend this meeting is that they may acquaint themselves with all modern equipment that is on the market suitable for road construction and maintenance.

"The Convention offers an opportunity for engineers and contractors to study and compare different types of machinery. It further offers an opportunity to meet engineers and contractors who are interested in various phases of road work.

"The program given in connection with the exhibit has always been of the highest class and much favorable information can be obtained from the papers, talks and discussions offered."

THE ROAD SHOW

The manufacturers of machinery for building and maintaining roads and the producers of road materials take advantage of the Show to display the latest types of road machinery, equipment and materials. The man who attends the 1924 Good Road Show will have a chance to see every new piece of road building equipment that will be at work on the highways of the country next year. Most of the exhibitors at the Road Show bring their men to Chicago from all parts of the country for the Show, and it is possible to meet there nearly every one identified with the distribution of road building equipment and materials.

THE CONVENTION

The following is the official program of the convention:

OPENING SESSION TUESDAY MORNING, JAN. 15, 10 A. M.

Chairman—Frank Page, President, American Road Builders' Association.

President's Address, by Frank Page, Chairman State Highway Commission of North Carolina, Raleigh, N. C.

Highway Improvement a Continuing Business, by Thomas H. MacDonald, Chief, Bureau of Public Roads, Washington, D. C.

MATERIALS AND DESIGN. TUESDAY AFTERNOON, JAN. 15, 2 P. M.

Chairman—S. L. Squire, Deputy Minister of Highways, Ontario, Toronto, Ont.

Recent Development of Bituminous Base and Sand-Asphalt Road Construction, by E. R. Olbrich, National Research Council, Washington, D. C.

Outstanding Problems in Highway Bridge Design—Surface, Width, Vulnerability, Ground Plan, by E. F. Kelley, Senior Highway Bridge Engineer, Bureau of Public Roads, Washington, D. C.

Smoothness as a Factor in Pavement Life, by A. T. Goldbeck, Chief Division of Tests, Bureau of Public Roads, Washington, D. C.

TRAFFIC AND MAINTENANCE. WEDNESDAY MORNING, JAN. 16, 10 A. M.

Chairman—R. Keith Compton, Chairman Paving Commission, Baltimore, Md.

Traffic Surveys—Methods and Costs, by H. E. Hamlin, Superintendent of Repairs, Connecticut State Highway Commission, Hartford, Conn.

Traffic Surveys—Findings and Deductions and Their Lesson for the Road Engineer, by J. G. Mackay, Bureau of Public Roads, Washington, D. C.

Snow Removal—Organization, Methods and Equipment, by Edward E. Reed, Assistant State Highway Engineer, New Jersey State Highway Commission, Trenton, N. J.

Central Plant Maintenance—Possibilities for Large Concentrated Mileages, by Leroy C. Smith, Engineer Manager, County Road Commissioners, Wayne County, Detroit, Mich.

Highway Traffic Accidents—Classifications and Causes, by N. M. Isabella, Assistant Maintenance Engineer, Wisconsin Highway Commission, Madison, Wisc.

ADMINISTRATION. WEDNESDAY AFTERNOON, JAN. 16, 2 P. M.

Chairman—Frank Page, President American Road Builders' Association.

State Cement Manufacture a Highway Administration Policy:

(1) *Merchandising and Transport Conditions Which Prompted Consideration of State Purchase and Manufacture of Cement Road Building Materials,* by B. F. Piepmeier, State Highway Engineer of Missouri, Jefferson City, Mo.

(2) *State Purchase and Storage as a Means of Regulating Cement Supply and Price Without State Manufacture,* by C. N. Connor, Construction Engineer, North Carolina State Highway Commission, Raleigh, N. C.

Election of Officers.

Business Session

JOINT SESSION WITH ASSOCIATED GENERAL CONTRACTORS

THURSDAY MORNING, JAN. 17, 10 A. M.

There will be a joint session with the Associated General Contractors, which will be held on Thursday, Jan. 17th, when the presiding officer will be John W. Cowper, president of the Associated General Contractors of America. Mr. Cowper's reasons for arranging this joint session are set forth in the following letter:

"As President of the Associated General Contractors, I was very much interested in setting the date of our annual convention to concur with and immediately follow the Road Show because I believed it would be of the greatest interest to a great many, if not all, of our members to see the exhibit which you put up

"I have attended one show and then only for a very few minutes but sufficiently long to gain a very excellent impression of what benefits a contractor, whether he be in the road building game or some other line of construction, can get from a visit to this show.

"I expect personally to spend considerable time looking over the Road Show Exhibit and confidently count on a great deal of personal benefit that will react in my business to our good and I look forward to great success from holding our Contractors' meeting concurrently with yours."

The program of this joint session is as follows:

Chairman—John W. Cowper, President, Associated General Contractors of America, Buffalo, New York.

Purpose and Progress of Equipment Standardization, by C. E. Bement, President Novo Engine Co., Lansing, Mich.

Standard Highway Contracts a Public Service, by General R. C. Marshall, Jr., General Manager, Associated General Contractors of America, Washington, D. C.

Economic Aspects of Day Labor Construction, by Arthur S. Bent, Bent Brothers, Los Angeles, California.

Bonds as a Gauge of Responsibility, by H. H. Wilson, Managing Partner, Winston & Co., Harrisburg, Pa.

CONSTRUCTION. THURSDAY AFTERNOON, JAN. 17, 2 P. M.

Chairman—Frank Page, President American Road Builders' Association.

Can We Cut Down the Curing Period for Concrete Roads, by H. F. Clemmer, Testing Engineer, Illinois Division of Highways, Springfield, Ill.

Simplified Practice a Service to Industry, by R. M. Hudson, Division of Simplified Practice, Department of Commerce, Washington, D. C.

Controlling the Distant Units in a Highway Construction Organization, by O. M. Kipp, Construction Engineer, Minnesota Highway Department, St. Paul, Minn.

REGISTRATION

Registration blanks have been printed in the form of tickets of admission which are to be filled out and presented at the entrance to the Road Show, in exchange for which the individual will receive a badge which will admit him to the Road Show at any time.

No admission is charged to the Road Show. No one will be admitted, however, until he fills out and presents a registration blank to get his badge.

Registration blanks may be obtained at the entrance to the Coliseum. They also will be mailed free on application by mail to the American Road Builders' Association, 37 West 39th Street, New York City. Exhibitors have agreed to help distribute them through their field organizations.

This plan of registration should insure that all may be listed without any delay or inconvenience.

HOTELS

While Chicago has abundance of good hotels, all who expect to attend the convention should write at once and make reservations. The following hotels are recommended by the Chicago Association of Commerce, which also maintains a Bureau which may be called up in case a room can not be obtained in the hotel selected, the telephone number of the Bureau being Main 4808.

The hotels are classified below according to the prices charged. Any one may be reached by addressing it at Chicago, Ill.

From $1.25 Up—Bradley, Briggs, Colonial.

From $1.50 Up—Alexandria, Bismarck, Darlington, Gladstone, Grant, Hayes, Lakota, Metropole, New Gault, New

Southern, Stock Yard Inn, Strand, Victoria, Windsor Clifton.

From $2.00 Up—Atlantic, Board of Trade, Brevoort, Drexel Arms, Elms, Fort Dearborn, Great Northern, La Salle, Lexington, Luzerne, Majestic, Palmer House, Parkway, Plantus, Plaza, Plymouth, Sherman, Trenier, Washington.

From $2.50 Up—Auditorium, Del Prado, Hyde Park, Lorraine, Moraine, Morrison, Sheridan Plaza, Virginia.

From $3.00 Up—Chicago Beach, Congress Hotel and Annex, Edgewater Beach, Grasmere, Jackson Park Tavern, Melbourne.

From $3.50 Up—Ambassador, Cooper-Carleton.

From $4.00 Up—Drake, Somerset, Sovereign, Webster.

From $5.00 Up—Blackstone, Sisson, Windemere.

From $10 Per Week Up—Montezuma Lodge.

GET CERTIFICATES FOR REDUCED FARES

The various railway passenger associations covering the United States and Canada have granted a special reduced rate under the "Certificate Plan" of one and one-half fares for the round trip, covering all points in their territory to and from Chicago. The reduced fare is available not only for members of the American Road Builders' Association and delegates ot the congress but also for dependent members of their families. In order that they may profit by the reduced fare, delegates are urged to carry out the following directions:

Be sure to get from the railroad ticket agent a "convention certificate" when purchasing your going ticket. Immediately on arrival in Chicago present this to the Secretary at the convention, E. A. Birchland, who will endorse it and have it validated by a joint agent of the various railways. Unless so validated you can not obtain a fifty per cent reduction in the cost of your return ticket.

Snow Cleaning Appliances

A questionnaire on street-cleaning was submitted a few weeks ago to a number of cities, and replies from over 100 gave the kind of appliances used by them in removing snow from their streets. These replies were published in the September issue. Summarizing these replies and grouping them with respect to the appliances used, we find the following results:

Shovels were reported used by 37 cities, hand scoops by 1, "hand removal" by 1 and brooms by 2. Undoubtedly a number of cities also used hand labor which did not report it directly but stated that the snow was removed in trucks, wagons, etc., into which it was, in the majority of cases, thrown by hand. One city, however, reported the use of a snow loader and two reported steam shovels.

For removing snow from the streets, 51 reported using trucks and 54 used horse-drawn vehicles, which were reported in 23 cases to be wagons, in 9 cases carts and in 5 cases sleighs.

Fifty-three reported the use of plows, 5 specifying that they were attached to trucks, 2 to trolleys, 1 to a tractor and 5 that were horse-drawn. Graders or scrapers were reported for snow removal in 1 city and hose in 2 cities. A few replies that did not definitely specify the appliances used were: trolley cars, 2; tractors, 16; auto carts, 1; buckboards, 1, and large scoops, 1.

The use of snow-cleaning machinery has increased rapidly during the past few years, even more so on the highways than in cities, and indications are that the use will become even more general the coming winter. Several new appliances have recently been placed upon the market and are described in the department of "New Appliances" in this issue.

Missouri Concrete Pavement Cross-Sections

The chief engineer of the State Highway Department of Missouri, B. H. Piepmeier, announced on Dec. 3rd that the Department had changed its standard cross-section for concrete pavement from a uniform 7-inch thickness to uniform 6-inches except that the edges are to be 9 inches tapered back to 6 inches at 2 feet from the edge. The use of longitudinal steel along the edge of the pavement and the center joint will be continued. Contractors are specially notified that these dimensions are the minimum and any deviations must result in making the pavement thicker rather than thinner.

It is suggested to contractors that those who have been using 7-inch steel side forms may use these for the new-cross-section by attaching a 2x6 plank securely to the base; but suggests that if new forms be purchased, the 9-in. size be obtained, since Mr. Piepmeier assures the contractor that the Department "will confine all its paving work for the next few years, at least, to a 9-inch edge."

Self-Purification of Rivers

One of the most important papers presented before the Sanitary Engineering Section of the American Public Health Association at the recent Boston meeting was that by Surgeon W. H. Frost of the U. S. Public Health Service, in which he reported the progress made in studying the self-purification of the Ohio and Illinois rivers. It was believed that the degree of that class of pollution of the river that was being studied was best expressed by the number of B. coli per c.c. in the river water. Numerous determinations were made at different points below sources of gross pollution and, taking the averages at the several points, a curve was plotted using the numbers of B. coli as ordinates and the time in hours from a point of maximum pollution as abscissas. The curves so obtained were remarkably similar, both for the two rivers and also for summer and winter groupings. In each case the reduction in numbers was rapid, but the rate decreased and the curve approached the horizontal or zero axis after about 80 hours' flow. This showed plainly the great length of time necessary to restore to its previous condition a stream that has been greatly polluted. Of course there were considerable variations from the curve in individual counts, but not sufficient to throw any doubts upon the conclusion.

Foundation Excavation for Bronx Market

In constructing the foundation for a market at 152nd street and Exterior street, New York City, known as the "Bronx Terminal Market," H. P. Converse of Boston, who is contractor for the large foundation piers, is using ten derricks, finding economy in utilizing these in a systematic manner. Of the ten derricks about half of them only are doing bucket duty at a time, the other half being engaged in other work connected with the contract. The rotation of operation is as follows: Derricks using Blaw-Knox clamshell buckets of the "dreadnought" type first excavate the material from the pier holes and load it directly into trucks without rehandling, this being made possible by the proper spotting of the derricks. These derricks average about 900 cubic yards of excavated material a day. The material being excavated is a tough, sticky clay, but the clamshells are found to fill at every bite and to empty themselves readily.

The derricks then put the piles in place and drive them with a pile driver. Following this, they are used to place the sheathing and to drive it with pile drivers. This completes the work preliminary to mixing and placing the concrete for the foundation piers.

Derrick as Dragline

In recent construction work on the Wanaque dam a stiff-leg derrick has been used as cableway and drag-line excavator, by an arrangement devised by Ralph Young, superintendent for the contractor, W. H. Gahagan, Inc. Its use as a cableway is described for us by Frank C. Sellnow, senior assistant engineer on the work, as follows:

"In the excavation of earth and rock for the stream control conduit, a portion of the Wanaque dam under construction by the North Jersey District Water Supply Commission, novel use

STIFF-LEG DERRICK USED AS A CABLEWAY
Bucket of material at left being transported to dump cars between it and the derrick.

is being made of a stiff-leg derrick which had been employed in the construction of the corewall; briefly, it is being used as a cableway. The closing line is guyed to a tree or a bar secured in the rock and the dump bucket, suspended from a sheave block running on the closing line, can be pulled back by the lifting line, lowered and dumped in the 4 cu. yd. cars. When emptied, the closing line is tightened and when the bucket has been raised to a point where it will run back by gravity, the lifting line is slowly payed out until the bucket has been trolleyed back to the point of loading. If it is desired to swing the boom of the derrick in the event the cars are not directly under the cableway, this can be done as soon as all the load has been transferred to the lifting line."

As it is being used at this writing, the excavated material is loaded into buckets or skips which are carried across the river (shown at the left of the photograph) on the cableway. Most of the excavation now is rock, but in removing the overburden a drag-line bucket was used, the closing line being used as above and the lifting line used as a drag line.

EXCAVATING FOR FOUNDATION PIERS OF BRONX TERMINAL MARKET.

The Automobile and City Planning

Traffic congestion, of which the automobile is the chief cause, calls for planning of city streets with a view to relieving it.

By Alvan Macauley *

It is becoming unmistakably clear to the automobile industry that, particularly in the larger cities, it is faced with a new kind of "saturation point." While it has been discussing what the *buying* limit may prove to be, it is suddenly finding itself confronted with a *using* limit. Traffic congestion has already begun to inhibit the use of automobiles.

The phases of this same problem which affect the public at large, however, are even more important. These include the increasing number of traffic accidents, the effect of the automobile in decentralization of population, recreation facilities, transportation, and others. All of these are problems which can and must be solved to a large extent by the city planner.

That the automobile industry recognizes the relation between these problems and city planning is indicated by the fact that, at the recent closed car show in New York, there was a city planning exhibit with its charts, maps and models setting forth the city planning problems presented by modern traffic conditions.

The automobile did not make this traffic problem, although it may have expedited it. If a traffic even approximating in volume that now existent were dependent upon horse-drawn vehicles for handling it instead of the much more rapid automobile, the street congestion would be much greater even than it is.

Probably everyone realizes that there is a traffic problem, but few, even of the public officials, clearly realize that the problem lies in the street and not in the automobile. Traffic ordinances, traffic regulations, policing, mechanical devices, safety campaigns—all these are essential, urgent. But they are palliatives, not solutions. They require and should receive thought, public energy, cooperation and money, but should not divert these from the more fundamental city planning.

Possibly no solution of the traffic problem is practicable in the case of the great metropolitan cities. For the metropolitan cites of the near and far future, however, a solution is still possible; but it will be found in the drafting room and not in the courtroom.

The need of city planning is now commonly accepted, but the need of an application of its principles to the traffic problem is not so generally realized. What is needed now is the active cooperation of the autombile industry in the engineering solution of traffic problems through the proper designing of streets and street plans.

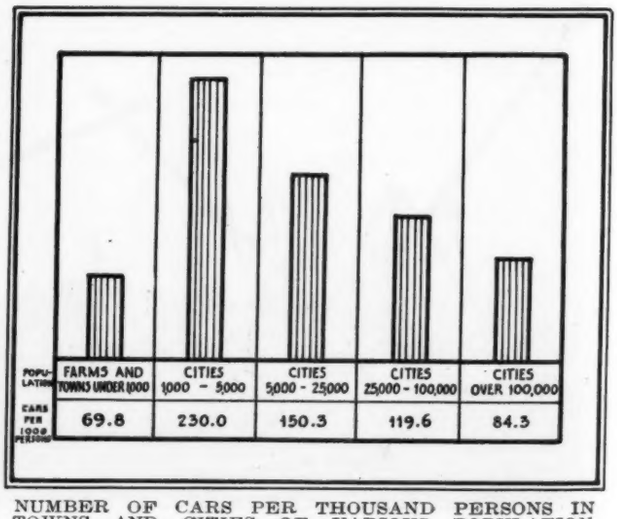
The problem in cities of over a million population must be left to traffic regulation experts and developers of huge projects of street-widening, elevated roadways and other changes involving millions. For the smaller cities, however, there is hope in a cooperative solution of the city planning problems presented, or, rather, in preventing the development of such problems.

In 1920 there were 43 cities having populations between 100,000 and 250,000, 13 with populations between 250,000 and 500,000, 9 between 500,000 and 1,000,000, and 3 with over 1,000,000 population. The following table shows the motor vehicle density (that is, the number of motor vehicles per square mile of area) of the 12 of these 68 cities which lead in this respect; also their present population and approximately the year in which they passed the 100,000 mark.

City	Motor Vehicles per sq. mi.	Population	Year Population Passed 100,000
Dayton, Ohio	1,885	152,559	1905
Detroit, Mich.	1,867	993,678	1876
San Francisco, Calif.	1,803	506,676	1865
Cleveland, Ohio	1,762	796,841	1871
Reading, Pa.	1,704	107,784	1914
Dallas, Tex.	1,695	158,976	1911
Milwaukee, Wis.	1,471	457,147	1877
Toledo, Ohio	1,454	243,164	1894
Akron, Ohio	1,448	208,435	1914
Bridgeport, Conn.	1,337	143,355	1909
Rochester, N. Y.	1,318	295,750	1882

Motor vehicle density is by no means a matter of number of automobiles in a city or even the ratio between automobiles and population. The 12 cities of the 68 which lead in number of persons per motor vehicle are: Los Angeles, Salt Lake City, each 3; Dallas and Houston, each 4; and 5 in the case of Indianapolis, Kansas City, Minneapolis, Seattle, Spokane, Syracuse, Toledo and Youngstown. It will be noticed that only Dallas and Toledo appear in both lists.

A most important fact shown by the vehicle density table is that, of the twelve cities named, seven have between 100,000 and 250,000 popula-



NUMBER OF CARS PER THOUSAND PERSONS IN TOWNS AND CITIES OF VARIOUS POPULATION GROUPS.

*President, Packard Motor Car Company.

tion, two between 250,000 and 500,000, three between 500,000 and 1,000,000, and none over 1,000,000. This shows that the traffic problem is developing most intensely in those cities having less than 1,000,000 population rather than in the largest ones, and that those of under 250,000 are in the most danger. Conditions will probably be worse in the "newer" cities, as in this list seven out of the twelve have passed the 100,000 mark since 1890, six of them since 1900, and four since 1910. It is probable that more attention to traffic control is being paid by cities of over 100,000 population than those under this figure, but out of forty cities leading in motor fatalities in 1922, only thirteen were over 100,000 in size, while two-thirds of the number were under this size.

That the traffic problem is not due to size of city, congestion of population or automobile ownership but rather to the inadequacy of the city streets is further proved by the accompanying chart. This shows that as the population of towns and cities increases, the density of automobile ownership decreases. Those towns having a population between 1,000 and 5,000 have 230.0 cars per 1,000 persons; those between 5,000 and 25,000 have 150.3 cars per 1,000 persons; those in the 25,000 to 100,000 group have 119.6 and those over 100,000 have 84.3. Further, it is surprising to find that the only section of the country where country use of cars is greater than city use is in the Middle Atlantic States, New York, Pennsylvania and New Jersey—states where concentrations of population are greatest. What serious problems will be faced by the larger cities when autmobile ownership reaches the proportions there which it has reached in the smaller towns?

The effect of the automobile upon this problem should be clearly visualized by the city planner, and his street plans should be designed and built as a system of automobile traffic ways. To this end he should study the increase of automobile ownership in his city, study traffic counts and traffic streams; forecast population centers and business centers, and, having made such forecasts, plan to eliminate traffic tangles and provide for parking.

Automobile owners are beginning to see the importance of city planning as they could not see it when they were only walking citizens. And the automobile industry will do its utmost to make the visions and necessities of city planning alive for the automobile owner.

Road Maintenance in Indiana

Accurate record of the cost of maintaining a section of Indiana state highway by use of a grader was kept by A. A. Davis, superintendent, for the four-week period from August 20 to September 15, 1923.

During this period the grader was operated 22 days and traveled 557 miles, used 289 gallons of kerosene at 12.2c. per gallon, 13¼ gallons of gasoline at 14.2c., 21 gallons of oil at 74.5c., ¼-pound cup grease and ½-gallon transmission oil. These items cost as follows:

Kerosene $35.26, gasoline $1.88, oil $15.65, cup grease 20c., transmission oil 50c. In addition, two blades were purchased costing $16. The operator was paid $4 a day or $88. This gives a total cost of operation of $157.49

Mr. Davis figures the depreciation at $25, giving a total cost of $182.49, or an average of $8.30 per day, or of 33c. per mile. The grader used in this instance was a Wehr grader.

Pennsylvania Highway Finances

In a recent statement, Paul D. Wright, secretary of the Pennsylvania Department of Highways, has given some figures concerning the financial situation of the Department of Highways, in connection with a plea for a vote on November 6th favorable to the $50,000,000 bond issue for highway construction.

He stated that the program for highway construction for 1923 and 1924, comprising 275 miles, will exhaust all money in sight and available for construction work unless the bond issue should pass, and that there was little prospect of receiving any more funds from legislative appropriations.

The vote on the bond issue was 624,297 for, and 237,543 against, or more than 2½ to 1 in favor. Of the 67 counties, only 3 voted against the bond issue. Pennsylvania therefore seems to be unquestionably "sold" on the importance of improved roads.

There is a considerable revenue derived from motor license fees and others, but these are all vitally needed for maintenance. The total of these revenues is estimated at $17,000,000. The maintenance requirements per year are estimated at $24,500,000, divided as follows:

1. General repairs—all classes—earth, stone, concrete, etc., and maintenance of equipment.	$4,850,000
2. The surface treatment of oil and chips to about 3,000 miles of stone road. This is necessary for the conservation of the investment in them and to keep them in travelable condition..	1,500,000
3. Extensive resurfacing with penetration macadam of waterbound macadam roads which are worn out and too light for the traffic demands	5,500,000
4. A long-time program of replacement of all these stone roads with a more durable type, such as concrete	5,000,000
5. Replacement of out-of-date and weak guard rail at dangerous locations by our present type of cable guard rail.	750,000
6. Widening of Lincoln Highway and other important roads to relieve dangerous curves and narrow conditions	550,000
7. Repairing and replacing bridges which may be too narrow or too light and unsafe for the traffic requirements	500,000
8. Maintenance of Borough Roads on State Highways	1,750,000
9. Township Reward, $1,000,000 a year appropriated of the motor license fees by the legislature	1,000,000
10. Elimination of grade crossings	1,500,000
11. Overhead on maintenance operations	1,600,000
Total	$24,500,000

Even should it be claimed that some of these items are not properly classed as maintenance, the fact remains that they are essential expenditures in that they are necessary to conserve former investments keep the roads in a travelable condition and provide for the safety of the users.

Tunnelling on the Skagit River Project

Hydro-electric power for Seattle, Washington, is being developed on the Skagit river at a point slightly over 100 miles from that city. The Skagit river is 150 miles long, with a drainage area of about 3,000 square miles. The upper third of the river with 1,200 square miles of drainage area is included in the power development now under way and the total power ultimately available will be 558,000 horsepower. Three projects are contemplated, known as the "Ruby," "Gorge" and "Newhalem," respectively. The first includes constructing a concrete dam of gravity section 480 feet high and 1,000 feet long, creating a reservoir 23 miles long, 1,600 feet above sea-level and with a capacity of 1,300,000 acre-feet. Water from this reservoir will flow to the power house through a 28-foot tunnel 3¼ miles in length with a capacity of 6,000 cubic feet per second.

The Gorge reservoir will be formed by a gravity type concrete dam 240 feet high and 600 feet long. Water from this reservoir, which will back up to the Ruby tail race, will flow through two concrete-lined pressure tunnels with an excavated diameter of 23 feet 6 inches and a length of 11,000 feet, while three penstocks from these to the power house will be excavated through solid rock, steel-lined, 11 feet inside diameter.

The Newhalem development includes a timber crib diversion dam 4 feet high and a tunnel 2,680 feet long.

The voltage for transmission purposes over the 107 miles from the Ruby plant to Seattle will be 165,000 volts.

The entire project is under the direction of S. F. Uhtern, chief engineer of Skagit River Development, with A. J. Turner as engineer in charge of construction.

Tunnelling, it is seen, is one of the chief features of the several projects. The present tunnelling contract is being carried on by R. C. Storrie & Company of San Francisco, under the direct management of R. B. Muir and construction supervision of R. C. Hockley and R. Scott.

Tunnelling is done by the bench and heading method, the heading being about 7 feet by 18 feet. Usually about thirty drill holes, using a V type of cut holes, are employed in breaking an 8-foot round, and are loaded with about 200 pounds of Giant V. LF gelatin 60 per cent. 1-1/4x8. The bench is broken with about twenty holes about 18 feet deep loaded with about 300 pounds of Giant V. LF 40 per cent. and 60 per cent. 1-1/4x8.

In firing the rounds, Delay electric blasting caps are used connected in parallel and fired from a power line of 110 volts. The caps used in the heading are of series 1 to 8 with 10-foot wires, and those used in the bench rounds are series 1 to 10 with 20-foot wires.

Steam shovels are used for mucking and the muck trains are hauled by storage battery locomotives.

Some unique equipment has been designed for this work and built on the spot. Among others may be mentioned a drilling carriage mounted on two muck car trucks. This is of framed timber construction with a top platform nearly level with the heading floor, which facilitates the work on the bench and the transportation of drills and other material to and from the heading while the bench is being drilled. The drill bars are so designed as to fold back against the side of the car when the car is to be moved out. A lower platform may be used for extra equipment. All air, water and electric light connections are provided for on the car. With the bars in drilling position, four air drills can work simultaneously. This equipment is used in drilling the bench, 18-foot to 20-foot steel being used.

For the above information we are indebted to A. H. Clough, of the Giant Powder Company.

Air Map of New York

The aerial work of making a photographic map of New York City was completed in November and the mapping work is well advanced. About 625 square miles is included in the area surveyed, 2,000 exposures were necessary and 3,000 miles flown. The contract for the map was made with the Fairchild Aerial Camera Corporation on July 10, 1923, calling for the delivery of the map by April 15, 1924, and three planes have been over the city every good photographic day since the former date.

Two maps are being made, one at a scale of 600 feet to one inch covering 400 square miles within the official city limits, to be delivered in 140 sections, each about 14 x 21 inches. The other map is at a scale of 2,000 feet to one inch, covering 625 square miles, which includes, besides the city, parts of adjacent counties and of New Jersey, and will be made in one map 10 x 8 feet.

Fifteen engineers and surveyors are employed checking controls and assembling maps. If a negative shows a very small degree of tilt, this is corrected in the printing process. Also each print has to be brought to the required scale by enlargement or reduction, requiring a finely calibrated adjustment of the enlarging camera.

The map will show every structure in the city, fences, trees, crowds and roadway traffic—every physical feature, both animate and inanimate, that was not under cover at the time the photograph was taken. It can, therefore, be used for a variety of purposes by the different municipal departments and in investigations made for city planning, traffic control and many others.

Widening an Indiana Pavement

Owing, it is believed, to the example set by the Ideal Section of the Lincoln Highway, the Town Board of Dyer, Indiana, expects to construct two 11-foot strips of concrete pavement, one on each side of an existing 18-foot concrete road, extending from the western end of the Ideal Section to the Illinois State line, thus increasing the width of this road to 40 feet, the same as the Ideal Section itself.

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The Road Convention and Show

Considerable space in this issue is devoted to conventions of the American Society for Municipal Improvements and the American Road Builders' Association. The former, held last month, was the annual meeting of that national society that devotes more attention than any other to municipal engineering, including city streets; while the latter will next month gather from all over the country engineers, contractors and public works officials who are interested in constructing and maintaining roads.

Road construction and maintenance leads all other branches of public works in amount of money spent and in number of engineers and contractors engaged on it. Also, it is the newest branch and that in which there is the most rapid growth in both science and practice. It is therefore evident that for engineers and contractors this convention of road builders and exhibition of machinery and appliances is the big event of the year. A highway contractor or engineer who misses it loses his annual opportunity of getting up to date on a subject that makes enormous advance even in the year between conventions.

At this convention, among other possibilities offered to engineers, is that of learning and discussing the latest results from tests conducted by federal and state authorities, as well as information derived from study of the action of roads in service, and contractors can learn the latest methods of handling materials and economizing in labor; while both can promote that mutual understanding of each other's viewpoints which is essential to the best results. At the show, contractors can see and examine machines, one or more of which may next year enable them to cut down their operating costs and change a loss to a profit, or to offset the impossibility of getting sufficient labor at reasonable wages by getting along without it.

It is the occasion of the year for highway men to know and become known.

Lighting Highways

A century or two ago city streets were unsafe for travel by night, either on foot or by vehicles, the only illumination being furnished by lanterns or torches carried by those using the streets. Highways are now in much the same condition, being illuminated at night only by the lights of the automobiles or other vehicles using them; and the result is far from satisfactory, for if the light is bright enough to render somewhat less dangerous a speed that would be comparatively safe in the daytime, the glare in the eyes of those driving approaching vehicles is so blinding as to invite collision. Moreover, the headlight often fails to reveal a turn in the road or other dangerous feature.

Highways are now more travelled by night than were city streets in the days before street lighting, and the reasons then calling for adequate lighting of streets now even more urgently demand the lighting of highways.

Nor is safety the only reason. In an article in

the November issue of Public Works dealing with street lighting it was stated that where streets that carry heavy traffic are adequately lighted they can be used at night, and this does much toward relieving congestion on them by day; and the lighting of roads would similarly tend to diminish day-time congestion.

The dangers and inconveniences of night travel on highways can be very largely removed by the use of lighting units that have recently become available, whereby sufficient illumination can be thrown upon the entire roadway to reveal clearly the edges of the pavement, any turns in the road, approaching vehicles, pedestrians, or other permanent features or temporary obstructions which it is desirable to avoid; the lighting units being so elevated above the road and the rays so directed as to reduce to a minimum the glare in the eyes of those driving the vehicles.

The model section of the Lincoln Highway included lighting as one of the features which it offered for imitation; and the considerable and increasing night use of the highways for pleasure riding, and the possibility of avoiding day congestion by continuing the use of the highways by commercial vehicles well into or through the night, offer arguments in favor of lighting that will undoubtedly result in the rapid adoption of this improvement on our busiest highways.

Unintelligent Bidding

Without knowing whether the lack of definiteness in the plans and specifications are to blame, or recklessness, carelessness or ignorance on the part of the bidders, bids received by the Sanitary District of Chicago last October showed such wide divergencies that it seems unquestionable that some of the bidders used poor judgment, either by bidding on plans that they did not understand, or in ignorance of even an approximation of what it would cost to do the work; or else some just jacked up their figures on the possibility of landing a fat thing.

The work consisted of 4,840 feet on a 6½-foot outfall sewer, with some minor appurtenances, and the bids ranged from $26 to $61 a lineal foot, four being below $35 and three above $50. Of the appurtenances, one was a junction chamber, bid at a lump sum, and the bids varied from $1,500 to $15,600, five bids being below $3,000 and three $7,000 and over. On another structure the bids ranged from $1,500 to $17,800.

Is contracting a legitimate business or just a gamble?

Winter Preparation for Highway Construction

On October 20 a highway of reinforced concrete between Schnecksville and Pleasant Corner, Pennsylvania, was opened with elaborate ceremonies, bands, hundreds of automobiles, etc. This stretch is about 4½ miles long, 16 feet wide, 7 inches thick at the center and 5 inches wide at the sides, reinforced with galvanized wire mesh weighing 65 pounds per hundred square feet. The grading consisted of 16,000 cubic yards of earth and shale, which was rough graded with a steam shovel. Because of springs and the flatness of the ground, 8,000 feet of drain tile was laid in and alongside the road for draining the subgrade. The road was built under state supervision but paid for entirely by Lehigh County, the cost being $170,000.

The contract was completed one month sooner than had been contemplated, which is probably to be attributed to the foresight of the contractor, the Juniata Company. The contract was awarded last winter and the contractor, anticipating scarcity of material in the busy summer season, hauled and stocked on the job in three large stock piles the entire amount of sand and stone necessary to complete the work, a considerable time before the opening of the working season. Work began on April 23. Sand and stone were elevated from the stock pile by conveyor into bins and delivered from the bins through measuring hoppers to trucks carrying five batches, and by them to the mixer. This road being in the center of the Pennsylvania cement manufacturing district, the cement was sent from the mill direct to the mixer. The work was in direct charge of W. W. McCray for the contractors.

University of Michigan Highway Teaching Facilities

The University of Michigan in 1919-20 offered the first course in highway transport to be given by an American educational institution, since which time ten others have been inaugurated. In 1923-24 25 courses in highway engineering and highway transport are being given by this university and the Board of Regents has established a Chair of Highway Engineering and Highway Transport and appointed a professor of this subject, an associate professor, assistant professor, instructor, three assistants and a librarian. By an arrangement with the State Highway Department all the testing of highway material for the State of Michigan is done in the university laboratory.

Because of the development of this course and the demand for additional facilities the Board of Regents has allotted 20,000 square feet of space for this division in the new engineering building which was opened for use at the beginning of the present college year. This space is divided up into various rooms for laboratory work, lecture rooms and offices of the teaching force.

Pennsylvania Transport Survey

The State Highway Department of Pennsylvania on November 8 began a motor transport survey of all the important roads of the State, in which it is receiving the co-operation of the United States Bureau of Roads. The information thus gained will be used in determining the width and thickness of pavements to be built in the future.

This transport survey is believed to be the most intensive ever undertaken. It involves the operation of 78 truck weighing stations and over 300 recording stations, so distributed over the primary and secondary roads of the State as to give the most accurate estimate obtainable of the

highway traffic. It is expected to continue it for an entire year. At each of these stations a sign will be placed calling upon all traffic to stop and to fill in cards giving the license number of the motor vehicle, the width and type of body, manufacturer, capacity both loaded and light, and weight.

Stream Line Filters

What is probably the latest novelty in the waterworks field was described by George W. Fuller in a paper read at the meeting on "Pollution of Streams by Industrial Wastes" held at the Engineers' Club of Philadelphia on October 16. This was a new kind of filter called "stream line filters" which are the invention of H. S. Hele-Shaw, last year president of the British Institution of Mechanical Engineers. He discovered the principle of the filter last winter while experimenting with lantern projections in a study of the behaviour of films under pressure. Announcement of the discovery was made before the Royal Society on May 10 of this year. A considerable interest has been shown in England in this discovery.

The stream line filter in its simplest form is made of a pack of specially prepared paper, impervious to water and oil and somewhat roughened to provide passage ways, the pack being held within a container between two press heads by means of which any desired pressure can be exerted upon the pack. Through the entire pack are two alternate sets of circular holes, the larger holes being for the influent and the smaller ones for the effluent. At one press head are channels through which the influent is lead to the larger openings and at the other pressure heads are channels connecting with the smaller openings for removing the effluent. The influent, even when introduced under heavy pressure, can pass from the larger openings to the smaller ones only through the laminae of the heavily compacted pieces of paper with a stream-like motion.

Such a filter requires cleaning at intervals, the frequency of which depends upon the quantity and quality of influent filtered. Cleaning may be done in one or both of two ways. Either the deposit on the walls of the influent tubular holes is pushed through suitable ports in the press head by means of light, free-fitting pistons which are actuated by the pressure normally used in pushing the effluent through the filter; or the deposit is removed by forcing the effluent back through the effluent openings, through the laminae of the compressed paper pack and thence through the walls of the influent tubular openings and out through the ports. Mr. Fuller stated that the packs, dismantled after use, which he examined, showed a complete absence of stain or other sign of use other than at the edges of the influent openings.

Edge filtration, as distinguished from ordinary filtration through a body of granular material, depends upon the ability to regulate the attenuation of the films in which the liquid passes in streamlike motion. It is essential that the material used in the filter have a rough surface so as to provide passageways. The paper used by the inventor is not only impervious and relatively cheap, but its flexibility allows pressure to be applied to the packs in varying degrees, and thus provides a control of the size of the passageways. This paper is said to withstand ordinary acid solutions up to 10% strength, but filtration is interfered with by alkalis approaching 1%.

Among other accomplishments of this filter it is said to remove the color from swampy water and reduce dilute activated sludge to a 60% water content. As a result of passing certain mixed liquids through the filter several times and increasing the pressure with each filtration, different substances are removed each time, thus accomplishing what for convenience has been designated fractional filtration. English scientists have suggested the possibility of grading bacteria of different sizes, the concentration of enzyme solutions and the separation of ultra microscopic micro-organisms.

Quarrying Stone for LaCrosse County Highways

By F. H. A. Nye

The contour of LaCrosse County, Wisconsin, is one of valleys between ridges, and numerous coulees running up from the valleys between spurs that branch off from the ridges. State highways are laid through the valleys and along the ridges, while county roads lead up into the coulees. Each coulee has a small stream flowing down it into its valley and there joining the larger stream.

Nearly 300 miles of tar-bound macadam has been built in the county and is steadily being added to. The crushed rock required for its construction is obtained from the main ridges at an elevation of approximately 400 feet above the valley, where it is found in large deposits of nearly pure limestone.

LaCrosse County is operating four quarries with a crushing outfit at each, located at points convenient for the highway construction. The quarries are all on lands owned by private parties, who receive 5c per yard for all stone quarried.

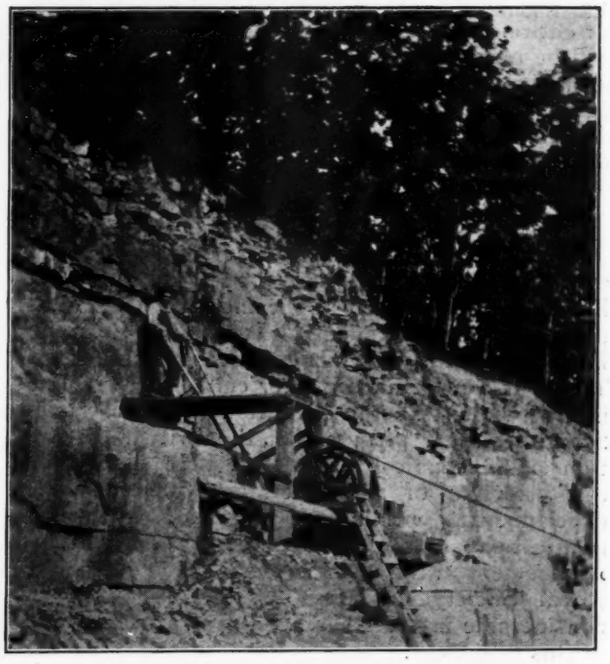
The method of bringing limestone from the quarry to the bottom of the valley, where it is crushed and stored in bins for distribution by trucks, is believed to be somewhat unusual. A track is laid from the quarry to the crusher with a diamond turnout at mid-length; on this track run two cars, each having a capacity of about 2,500 pounds. The two cars are connected by a 3/4-inch cable which passes around a drum at the top of the incline. The weight of the loaded car as it descends is more than sufficient to pull back to the quarry the empty car, the two passing each other at the turnout and the speed be-

ing controlled by a brake applied to the drum at the quarry.

One photograph shows the clearing through the trees from the quarry to the crusher and the other gives a near view of the cars passing each other. The former illustration shows also the crusher, elevator and storage bins. A branch macadamized road leads from the bins to the main highway.

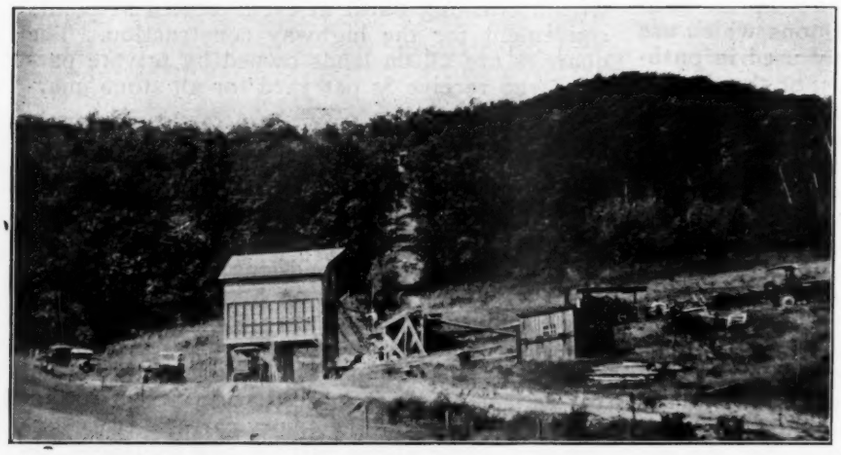
At one of the quarries the machinery is operated by a gasoline engine, but at the others steam engines are used. Water for the engines is obtained from wells. From 15 to 20 men are needed for continuous work in all sections of the plant and receive $3.50 per day of ten hours, at the present time. One hundred yards of crushed stone is considered a good day's work and the cost is figured to be between $1.00 and $1.50 per cubic yard. The stone is divided into three grades by a revolving screen located at the top of the bins.

The track and car equipment was bought at low cost from wrecking companies, the track being obtained as low as $28 per ton. A new crusher cost about $1,400, a twenty-five horsepower steam engine, $1,800, and the gasoline engine, $450. The bin was built of timbers taken from old bridges and cost about $400. The balance of the equipment, including the screen, well and pump, brought the total cost of the steam plant up to nearly $5,000. While the cost of the gasoline engine was much less than that of the steam engine, gasoline costs about the same as coal, and the long usefulness of the steam engine is considered to more than balance its extra cost.



SHEAVE AND BRAKE AT QUARRY FOR CONTROLLING CABLE.

CARS PASSING EACH OTHER MIDWAY BETWEEN QUARRY AND CRUSHER.



STONE-CRUSHER AND TRACK LEADING UP HILL TO QUARRY.

Repairs by Public Service Corporations

The making of repairs to sub-surface structures by the public service corporations has caused so much inconvenience to traffic in New York City that the Bureau of Engineering, with a view to eliminating this condition, has adopted a policy of requiring these corporations to undertake their work during the nighttime. In some cases it has been found necessary to require the work to be continued both day and night throughout the 24 hours. Where it is considered inexpedient to work by day, cuts made during the night operations are planked over so that the thoroughfare may be used to its fullest capacity during the intervening daytime. This policy has proven to be of the greatest help at points of severe traffic congestion.

Maintenance of Granite Pavements

Application of bituminous filler and sand makes a smooth surface and prevents "cobbling."

By R. A. MacGregor,* M. Am. Soc. C. E.

For a number of years the Borough of Manhattan has refilled the joints of granite pavements with a bituminous filler where the original filler has been removed by the action of traffic and the cleaning of the streets.

In some cases the filler has disappeared in a few years, leaving the joints ½ to 1 inch low and thus exposing the corners of the blocks to the blows of traffic. The result is turtle-backed blocks and a rough surface.

In the repouring of the joints the surface is well swept with hand brooms and the joints raked out to remove the dirt as much as possible. Until about three years ago the practice was, after the pavement had dried, to pour the filler into the joints from pots with spouts, but now the practice is to pour the filler from buckets over the surface, spread it with squeegees as thin as possible and then cover the whole with sand. This protects traffic, both vehicular and pedestrian, from the sticky material and vehicular traffic works the sand into the bituminous filler, forming a mastic.

On new work the filler is mixed with hot sand, in the proportion of 40 per cent sand and 60 per cent filler by volume, before pouring and this mixture is then squeegeed into the joints, as little as possible being left on the surface of the blocks.

In either case traffic before long wears the mastic off the surface, while the filler in the joints is rolled flush with the head of the blocks, making a smooth surface and protecting the corners or edges of the blocks from chipping.

The annual reports of the borough show that in 1921 114,400 square yards of granite pavement was so treated at a cost of 38c per square yard, and in 1922 77,400 yards at a cost of 41c per square yard was treated. The costs given might be reduced by the use of machines for mixing, which would be practical for large areas and are being used on large construction jobs.

The use of this method by other city and county authorities might well be considered, both from the point of view of economy in maintenance and of comfort to the traveling public. This was forcibly impressed on the writer on recent passages over one of the causeways between Jersey City and Newark. This is a comparatively new pavement and the blocks are rapidly being worn round or turtle backed. A comparison of this roadway with some in Manhattan 10 to 12 years old would prove the value of maintaining the joint filler flush with the top of the granite blocks.

*Assistant Engineer, Department of Public Works, Borough of Manhattan.

Cost of Test Borings

The commendable practice of obtaining all possible data in connection with underground conditions for the information of prospective bidders is becoming more general but is still comparatively infrequent. Figures concerning the cost of investigating underground conditions are by no means numerous and bids recently received in New York City by the Board of Water Supply for making test borings in the various boroughs of the city and vicinity will undoubtedly be of interest to engineers. Three bids were received as follows:

For making land borings, a total of 11,000 lineal feet, the bids per lineal foot were $4.95, $7.50 and $8, an average of $6.817. For making river borings the bids per lineal foot were $9.95, $17 and $19.25, an average of $15.40. Where the casings were to be left in place the prices bid per pound were 10c, 12c and 30c, an average of 17c. The three contractors were from New York City, Scranton and Pittsburgh, respectively.

Street Inlets and Street Cleaning Statistics

Figures from 154 cities illustrating the relative number that use inlets without catch basins and with catch basins. Also data supplementing tables on street cleaning previously published.

Catch basins are necessary in some locations and under certain conditions, but we believe that fully half of those now in existence are a liability rather than an asset. This idea has slowly been finding acceptance by engineers. To what extent, is indicated by the table on the following page showing conditions in 154 cities in 36 states. As a matter of fact, present practice is more in favor of the omitting of the catch basin than these figures would indicate, since they represent inlets built years ago as well as those constructed in accordance with present ideas. In fact, it seems fair to assume that a city that has any inlets without catch basins realizes that catch basins are necessary only under certain conditions.

Of the cities reporting on this question, almost half (45 per cent.) have built inlets without catch basins, and 24 per cent. have no catch basins in service. These last include some good sized cities, such as Omaha, Neb., Quincy, Ill., and Wichita, Kans. Worcester, Mass., has 550 inlets without basins and 32 with basins.

In the October issue we published tabulated statistics concerning street cleaning from about two hundred cities, and in tables on page 397 we give further information received since those tables were compiled; while on page 396 we

give information from the same cities supplementing the table on "Disposal of Street Sweepings and Garbage" that was published last month. These all remove snow from a part of their streets, except Bonham, Texas, which probably has no snow.

STREET INLETS

City	Number of Street Inlets: With catch-basins	Number of Street Inlets: Without catch-basins
California		
Napa	20	—
Palo Alto	52	—
San Luis Ubispo	10	—
San Mateo	4	—
Stockton	223	—
Florida		
Sanford	—	90
Illinois		
Beardstown	30	—
Canton	12	—
Centralia	—	222
Mattson	75	—
Normal	—	5
Quincy	—	7
Indiana		
Elwood	—	48
Fort Wayne	13	—
Gary	25	—
Huntington	30	—
Indianapolis	112	162a
Lafayette	52	18
Peru	41	15
Seymour	—	4
Terra Haute	20	—
Wabash	4	1
Washington	2	—
Iowa		
Clinton	100	—
Mt. Pleasant	12	—
Red Oak	6	—
Kansas		
Emporia	6	17
Manhattan	20	—
Wichita	—	92
Kentucky		
Ashland	10	12
Louisville	240	—
Madisonville	15	—
Louisiana		
Lafayette	—	32
Lake Charles	3	—
Maine		
Augusta	6	—
Portland	30	—
Rockland	1	—
Maryland		
Salisbury	8	—
Massachusetts		
Adams	20	5
Cambridge	23	—
Fitchburg	14	—
Lowell	23	—
Natick	10	—
Newton	82	—
North Adams	16	1
Worcester	32	550
Michigan		
Battle Creek	4	10
Dowagiac	8	—
Hastings	82	—
Ludington	25	—
Marquette	16	—
Mt. Clemens	30	—
Minnesota		
Cloquet	34	—
Faribault	14	—
Hibbing	—	15
New Ulm	34	—
St. Cloud	27	—
Stillwater	96	—
Willmar	36	—
Mississippi		
Clarksdale	—	10
Hattiesburg	—	30
Missouri		
Fulton	—	5
Kansas City	584	—
St. Louis	196	—
Montana		
Billings	3	150
Bozeman	—	29
Great Falls	43	36
Kalispell	4	—
Nebraska		
Lincoln	—	24
Omaha	—	634
New Hampshire		
Concord	20	—
New Jersey		
Bayonne	200	50
Long Branch	20	—
Newark	74	—
New Brunswick	14	—
Phillipsburg	—	20
Westfield	12	—
New Mexico		
Alberquerque	—	350
New York		
Binghamton	41	11
Elmira	41	—
Endicott	12	—
Herkimer	23	6
Ilion	42	3
Johnson City	6	—
Johnstown	13	—
New York—Manhattan	175	—
Ogdensburg	5	3
Oneida	—	12
Schenectady	98	—
Tarrytown	4	—
North Carolina		
Greensboro	35	—
Wilmington	—	24
North Dakota		
Fargo	27	—
Minot	—	125
Ohio		
Alliance	15	15
Ashtabula	40	—
Bowling Green	7	—
Chillicothe	10	—
Circleville	9	—
Dayton	122	36
East Cleveland	25	—
Findlay	245	163
Lakewood	11	39
Logan	6	—
Ohio (continued)		
Marion	6	—
Middletown	—	11
Newark	32	11
Urbana	—	100
Oklahoma		
Ada	20	5
Henryetta	98	—
Muskogee	34	—
Vinita	2	—
Oregon		
Astoria	59	—
Oregon City	20	—
Pennsylvania		
Chambersburg	2	—
Clairton	—	40
Clearfield	—	20
Connellsville	—	1
Dunmore	15	2
Ellwood City	—	12
Luzerne	2	—
Meadville	29	—
Norristown	—	12
Oil City	2	25
Pittsburgh	101	—
Rankin	6	—
Rhode Island		
Pawtucket	24	13
Providence	102	38
South Carolina		
Greenville	40	—
Orangeburg	—	63
Spartanburg	50	—
South Dakota		
Watertown	10	—
Tennessee		
Clarksville	—	10
Dyersburg	30	—
Jackson	—	40
Texas		
Abilene	—	3
Beaumont	—	30
Denison	—	12
Eastland	—	10
Ennis	6	2
Weatherford	10	—
Virginia		
Bristol	40	25
Richmond	233	—
Washington		
Port Angeles	51	—
Spokane	100	—
Tacoma	35	—
Walla-Walla	5	25
West Virginia		
Bluefield	168	15
Fairmont	20	—
Morgantown	—	40
Wisconsin		
Madison	27	52
Oshkosh	—	80
Two Rivers	—	30
Wausau	41	—

a Connected to catch-basins.

DISPOSAL OF STREET SWEEPINGS AND GARBAGE

City	Disposal of Street Sweepings	Change in Disposal of Garbage This Year	New Method Contemplated	Reason for Making Change
Illinois:				
Urbana	Hauled to dump ground	None	.....	.....
Indiana:				
Kokomo	Haul to dump	None—still feed it	.....	.....
Maine:				
South Portland	Carted to dump	None	None	.....
Massachusetts:				
North Adams	City farm	None	None	.....
Minnesota:				
Minneapolis	Taken to dump	.....	.....	.....
New Jersey:				
Millville	Filling lots	None	None	.....
Westfield	Placed in pockets on unoccupied ground	None	None	.....
Ohio:				
Bucyrus	Hauled to city dump	Patrons pay for service	None	.....
Toledo	Hauled to dump	None	Desire some method	Cut expense in half
Rhode Island:				
Providence	Removed by farmers or left on dump	.....	.....	.....
Texas:				
Bonham	Fill in public park	Crematory	.....	.....

STREET CLEANING STATISTICS

City	What percentage of sidewalks does city clean?	Snow Removed by City: From how many miles of streets?	Snow Removed by City: Methods and apparatus used	Area of Streets on Which City Uses: Hand Brooms	Area of Streets on Which City Uses: Machine Brooms
Illinois:					
Urbana	25; snow only	35	Horse-drawn wooden V-shape plows	6 or 7 blocks, business district	None
Indiana:					
Kokomo	None	25	Plow and trucks	35 miles	None
Maine:					
South Portland	None	70	Shovels and teams	15% of width	85% of width
Massachusetts:					
North Adams	None	3, business dist.	Trucks and scrapers	.....	.....
Minnesota:					
Minneapolis	Snow only; all except business streets	30	Shovel into sleds and wagons and dump into sewers	568,400 sq. yds.	.....
New Jersey:					
Millville	None	1, business dist.	Snow plows, cart with teams	53,000 sq. yds.	None
Westfield	5; snow only	1½	Motor truck, snow plow, horse-drawn wagons	30,000 sq. ft. business section	Residential section
Ohio:					
Bucyrus	None	32	1-man grader	20 squares	.....
Toledo	None	4, business sect.	Trucks and wagons	Approx. 10 miles	.....
Rhode Island:					
Providence	None	11	Snow shovels, scoops, road machines, snow removers, plows, trucks	360,000 sq. yds.	628,660 sq. yds.
Texas:					
Bonham	None	None	.....	None	1 mile

City	Area of Streets on Which City Uses: Pick-up Sweepers	Area of Streets on Which City Uses: Flushing Machines	Area of Streets on Which City Uses: Hand Flushing by Hose	Day or Night Cleaning by: Machine Sweeping in Business Dist.	Day or Night Cleaning by: Flushing	Average Area Per Man Covered by White Wing or Patrol
Illinois:						
Urbana	None	None	None	Day and occasionally at night	.....	6 or 7 blocks in bus. dist. by patrol
Indiana:						
Kokomo	None	35 miles	None	.....	Night	.....
Maine:						
South Portland	None	None	None	Mostly day	None	None
Massachusetts:						
North Adams	.....	5 mi. paved sts.	.....	Day	Day	.....
Minnesota:						
Minneapolis	1,041,600 yds.	3,393,500 yds.	None	Both	Both	About 12,000 sq.yd.
New Jersey:						
Millville	None	None	1 mi. business dist. gutters	No	Night once a week	.....
Westfield	None	None	None	Day	.....	None
Ohio:						
Bucyrus	None	None	None	Night	.....	10 squares
Toledo	None	All paved sts.	None	Night	Night	App. 8 city blocks
Rhode Island:						
Providence	630,925 sq. yds.	None	None	Night	.....	15,000 sq. yds.
Texas:						
Bonham	.....	None	.....	Night	.....	.....

City	Expenditure Last Year	Notes on Expenditure
Illinois:		
Urbana	$6,086.00	Grading, cleaning, etc.—brooms and shovels 3 or 4 times a year on residential streets.
Indiana:		
Kokomo	18,000.00	.....
Massachusetts:		
North Adams.	6,000.00	.....
Minnesota:		
Minneapolis	602,000.00	For cleaning paved streets and keeping dirt streets repaired.
New Jersey:		
Millville	2,500.00	.....
Westfield	3,500.00	.....
Ohio:		
Bucyrus	4,000.00	.....
Toledo	259,721.00	.....
Rhode Island:		
Providence	140,215.00	.....

Water Supplies of Large Cities

The committee on Municipal Health Department Practice of the American Public Health Association, in co-operation with the U. S. Public Health Service and utilizing funds provided by the Metropolitan Life Insurance Company, has completed a survey of the practice of municipal health departments in 83 cities of the United States of 100,000 poulation or over. This report, made public a few weeks ago, contains 468 pages of very interesting data concerning the health department practice of these cities, and a number of discussions of various features of health department work based upon the results of the survey. Engineers will be especially interested in the chapters relating to water supply, sewerage and sewage disposal.

From a study of the subjects last mentioned it is learned that of these 83 larger cities, 69 own their own water supplies and 3 are supplied by the Metropolitan Board of Boston, leaving only 11 in which the water is supplied by private companies. It was learned that in 29 cities the public water supply is used by 100% of the population and in an additional 26 cities by 95% or more. In the remaining cities the percentage of population using public water supply is less than this, being between 70% and 80% in 5 of the cities, while in Kansas City, Kansas, it is only 68%.

The percentage of population served by the sewerage systems of these cities is considerably less than that served by the waterworks. Estimates of any value were available for only 71 of the cities, and of these 71 only about 84% of the total population is served by public sewers, although between 95 and 100% was served in 27 of the cities. The lowest percentages recorded were as follows: Reading, Pa., 40%; Spokane, 50%; Houston and Des Moines, 55%; San Antonio, 62%; Kansas City, Kan., 63%, and Indianapolis, 65%.

Of all the cities only 10, containing 7.5% of the population of the group investigated, have treatment plants designed to care for the sewage of the entire city. Sixty-one of the cities dispose of their sewage by simple dilution into the nearest body of water, these cities containing a population of over 23,000,000. Five other cities, serving 5.2% of the total population considered, merely pass the sewage through coarse screens.

Sewerage Statistics

Figures relative to amounts and kinds of sewers laid during 1922 in thirty-eight cities, supplementing similar data previously published.

The tabulated data on this page and the following one supplement similar tables published in the July issue. They were compiled from questionnaires received since the preparation of the tables that appeared in that issue. The entire absence of figures for brick sewers serves to emphasize the extent to which concrete is replacing brick for large sewers.

VITRIFIED CLAY PIPE LAID IN 1922

City	Less than 24"—Feet	24" to 36" Feet	Standard or Double Strength
California:			
Visalia	2,200 storm 1,300 sanitary	None	.....
Connecticut:			
Norwich	4,902	....	Standard
Illinois:			
Centralia	3,000	2,200	Both
Chicago H'ghts.	3,000	....	.....
Danville	20,000	....	Standard
Glencoe	10,000	600	Standard
Highland Park	3,500	....	Standard
Kenilworth	4,000	1,000	Standard
Winnetka	4,500	....	Standard
Indiana:			
Brazil	7,200	....	Standard
East Chicago	7,934	....	Standard
Elkhart	8,500	2,000	.....
Mt. Vernon	6,000	2,400	Standard
Kansas:			
Salina	14,000	None	Double strength
Massachusetts:			
Haverhill	711	302	.....
Worcester	15,393	8,303	8"-18" std.; 20"-24" double str'gth
Minnesota:			
Fairmont	1,900	....	.....
Mississippi:			
Vicksburg	½ mi.	....	Standard
Missouri:			
Trenton	5,307	980	Standard
New York:			
Buffalo	56,622	None	Double, encased in 1:12 conc. up to springing line
Gloversville	3,200	....	Standard
Ithaca	1,500	....	Double strength
North Carolina:			
Durham	46,907	....	Double strength, 15" and larger
North Dakota:			
Grand Forks	3,708	....	Standard
Oklahoma:			
Chickasha	7,000	....	.....
Enid	14,912	428	.....
Shawnee	15,000	....	Standard
Pennsylvania:			
Tyrone	1,280	600	Standard
Texas:			
Brownwood	120,000	....	Standard
Virginia:			
Lynchburg	12,811	....	Standard No. 1
Washington:			
Seattle	96,214	818	Double, for 12" and larger
Wisconsin:			
La Crosse	9,000	....	Double
Wisconsin Rapids	6,700	300	Standard No. 1
Wyoming:			
Sheridan	5,511	....	Double

PIPE SEWERS OTHER THAN VITRIFIED CLAY LAID IN 1922.

City	Cement-Concrete Pipe: Less than 24" Feet	24" to 36" Feet	Larger than 6" Feet	Other Kinds of Pipe: Kind	Length Feet	Size
California:						
Long Beach	14.6 mi.	6 mi.	....	.....	....	.....
Montana:						
Butte	1,533	377	....	.....	....	.....
New York:						
Buffalo	....	....	....	Conc. Seg. Blk.	815	30"
Gloversville	3,144	....	....	.....	....	.....
North Carolina:						
Durham	3,046	1,258	....	C. I. pipe	9,876	6"
Washington:						
Bellingham	14,796	....	....	.....	....	.....
Seattle	1,299	328	332	C. I. pipe	893	Less than 24"
Wisconsin:						
Puyallup	450	....	....	Cem. drain tile	3,100	8", 10 & 12"

SEWERS OTHER THAN PIPE LAID IN 1922

City	Brick: Length	Brick: Dimensions	Concrete: Length Feet	Concrete: Dimensions	Concrete: Reinforced	Vitrified Clay Segment Block: Length Feet	Vitrified Clay Segment Block: Dimensions
California:							
Long Beach	....	.....	14.6 mi.	.....	.6 mi.	....	.....
Indiana:							
Mt. Vernon	....	.....	300	84 inch	Yes	....	.....
Massachusetts:							
Worcester	....	.....	1,394	54"x84" & 72"	1,084 ft. round	....	.....
Montana:							
Butte	....	.....	252	7' 4"x4' 6"	....	....	.....
New York:							
Buffalo	....	.....	....	.....	....	815	30"
Wisconsin:							
La Crosse	....	.....	1,100	.....	....	.....	....

LABOR-SAVING DEVICES

City	Devices Used by City or Contractor in Constructing Sewers: Kind	Length of Trench Used On—Feet	Devices Used for Cleaning Sewers: Kind	Amount of Work Done—Feet
Connecticut:				
Norwich	.....	.....	Hydraulic rotary cleaner	1,000
Illinois:				
Centralia	P. & H. backfiller	.....	Turbine	.....
Chicago Heights	Trench excavating machine	.....	None	.....
Danville	.....	.....	Turbine	.....
Indiana:				
Brazil	.....	.....	Self-propelling cent. nozzle on fire hose	.....
East Chicago	.....	.....	Kuhlman sewer cleaner	35,000
Elkhart	Clamshell excavator	7,000	Kuhlman sewer cleaner	2,000
Kansas:				
Salina	Trench excavating machine	15,000	Sewer cleaning rods	.....
Massachusetts:				
Worcester	Erie steam shovel, Byers auto crane	.....	Scrapers, horses, hoisting engines	.....
Missouri:				
Trenton	Greiman trenching machine	1,500	.....	.....
Montana:				
Butte	.....	.....	Self-propelling nozzle	.....
New York:				
Buffalo	2 Austin, 2 Parsons trench machines and backfillers	.....	Thompson's patent	Approx. 5 mi.
North Carolina:				
Durham	Parsons trencher	1 mi.	.....	.....
Oklahoma:				
Enid	Austin	6,000	None	.....
Shawnee	Ditcher	.....	Rotary water motors	1,000
South Dakota:				
Huron	Austin	7,000	.....	.....
Texas:				
Brownwood	Austin ditcher	.....	None	.....
Wisconsin:				
Wisconsin Rapids	.....	.....	Turbine sewer machine	1,500

Pollution of the Kansas River

The Kansas State Board of Health has published a report giving the results of a study of the pollution of the Kansas river and its tributaries, made with a view of determining the fitness of the river to serve as a source of municipal water supplies. Samples were collected at selected points at two-week intervals throughout a period of approximately a year and bacteriological and chemical analyses made of them.

From the information thus and otherwise obtained it was concluded that in most instances, above sources of pollution there are a few B. coli due to surface wash and natural soil conditions. This minimum number of B. coli is high as compared with similar conditions in other parts of the country. This minimum should be used as a standard of purity that could reasonably be expected throughout the course of the stream if it received no municipal sewage and storm water.

It is impossible to eliminate municipal storm water pollution, but it is possible to treat sewage so as to eliminate a large percentage of the polluting materials. Sewage treatment should be required where the distance and time between the place of pollution and the source of water supply are too short to permit of sufficient purification to render the water in a reasonably good condition. Treatment should also be required where local nuisance is caused by the inadequate amount of water in the stream receiving the sewage.

It was found that purification takes place to such an extent above the city of Topeka that the water at that city is in a reasonably good condition as compared with most points in the river above sources of pollution; but below Topeka the water does not attain a reasonably good condition before reaching Lawrence, and there is no sufficient flow below Salina to properly dilute the sewage of that city and a local nuisance exists. While conditions below Junction City and Manhattan are at present satisfactory, they may not continue so in the future.

Water Purification Statistics

Of the cities treating water, more than half use sedimentation and filtration and all but five chlorinate.

Of the several hundred cities concerning which waterworks information was collected by us through a questionnaire last Spring, 273 reported that their water supplies were purified in some way. Statistics concerning these were published in our May issue. Since then we have received similar information from seventy additional cities which purify their water, which information has been tabulated in the tables on the two pages following.

Of these cities, 56% use sedimentation basins. Fifty-six per cent. report filtration, 46% by means of rapid sand filtration, 3% by pressure filters and 7% by slow sand filters. Chlorination is used by 93% of the cities, one of them by the use of hypochlorite. Seven per cent. use copper sulphate, 6% employ aeration, and 14% soften the water. Of the sixty-five cities that employ chlorination, 28 do not treat the water in any other way, except that one employs sedimentation when the water is unusually turbid, one employs aeration, and three use copper sulphate.

WATER PURIFICATION

City	Waterworks Municipal or Private	Is Sedimentation Basin Used?	What Kind of Filters?	Is Water Chlorinated?	Is Water Softened?	Is It Treated in Any Other Way?	Cost of Purification Plant	Gallons Treated Last Year	Cost of Labor at Plant	Cost of Chemicals	Cost of Repairs	Cost of Power	Other Cost of Purification
Alabama:													
Florence	..	Yes	Gravity	Yes	Yes	No	.....	.....	.....	.....	.....	.....	.....
Arkansas:													
Eureka Springs	M	Yes	Pittsburgh gravity	Yes	No	.....	$25,000.00	15,000,000	$700.00	$150.00	.....	.....	.....
California:													
El Centro	..	Yes	Sand	Yes	No	No	36,000.00	900,000,000	.....	.....	.....	Ap. $9,000	.....
Redding	P	Yes	None	Yes	No	No	398.33	686,608,902	30.83	367.50	$85.21	None	.....
San Francisco	..	No	Rapid sand	Yes	No	No	4,398.45	39,311,600[a]	926.10	1,112.33	29.10	None	None
San Jose	P	No	Sand and gravel	Yes	No	No	15,000.00	1,500,000	1,020.15	418.30	284.19	$105.00	$36.79
Santa Cruz	M	No	None	Yes	No	No	2,000.00	300,000,000	100.00	.....	.....	.....	.....
Colorado:													
Delta	M	Yes	Gravity	No	No	No	.....	.....	.....	.....	4,000.00	.....	.....
Georgia:													
Atlanta	M	Yes	N.Y. Jewell & Hyatt	Yes	No	.....	.....	.....	.....	.....	.....	.....	.....
Cedartown	M	No	.....	Yes	No	No	.....	.....	.....	.....	.....	.....	.....
Newman	M	No	None	Yes	No	No	.....	.....	.....	.....	.....	.....	.....
Idaho:													
Boise	P	No	Natural gravel	Yes	No	No	5,000.00	1,000,000,000	None	250.00	150.00	None	None
Weiser	M	No	.....	Yes	No	No	1,500.00	100,000,000	.....	40.00	None	None	None
Illinois:													
Cairo	P	Yes	N. Y. Continental-Jewell rapid sand	Yes	No	.....	60,000.00	1,095,000	2,618.00	6,685.00	1,052.00	.....	.....
Hinsdale	M	...	Sand	No	Yes	No	25,000.00	189,649,743	1,200.00	9,700.00	1,500.00	1,850.00	.....
Rock Island	M	Yes	Mechanical gravity	Yes	No	.....	100,000.00	1,000,000,000	7,200.00	5,500.00	.....	.....	.....
Indiana:													
Bedford	M	Yes	None	Yes	No	.....	18,000.00	.....	.....	.....	.....	.....	.....
Goshen	M	Yes	None	No	No	No	20,000.00	400,000,000	5.60	None	None	None	None
New Albany	P	Yes	N. Y. Continental-Jewell rapid sand	Yes	No	.....	75,000.00	724,495,000	2,940.44	1,952.79	53.52	.....	88.84
Whiting	M	Yes	Gravity rapid sand	Yes	No	Aeration	Ap. 200,000.00	1,123,080,000	12,720.00	6,808.43	679.05	13,300.04	.....
Iowa:													
Boone	M	No	None	Yes	No	No	.....	400,000,000	.....	100.00	200.00	.....	.....
Kentucky:													
Cynthia	..	Yes	2 Pittsburgh	Yes	..	.....	35,000.00	500,000 per day	1,855.57	750.00	369.11	6,483.56	.....
Danville	M	Yes	Rapid sand	Yes	No	.....	Ap. 20,000.00	348,000,000	.....	1,186.00	156.59	.....	.....
Maysville	P	Yes	None	Yes	Yes	Yes	1,800.00	365,000,000	365.00	900.00	75.00	None	None
Maryland:													
Baltimore	M	Yes	Mechanical	Yes	No	Lime	1,500,000.00	34,500,000,000	.....	84,467	232.25	97,232.25	67,533.19
Massachusetts:													
Lawrence	M	No	Slow sand	Yes	No	No	$1,240.00	1,660,000,000	.....	35.00	.....	.....	.....
Michigan:													
St. Clair	M	No	None	Yes	No	No	1,306.00	273,750,000	.....	64.00	25.00	6,600.00	None
Missouri:													
Liberty	M	Yes	Rapid sand	Yes	Yes	Aeration	20,000.00	.....	.....	2c per 1,000	.....	8½c per 1,000	4c per 1,000, labor
Montana:													
Billings	M	Yes	Rapid sand	Yes	No	No	106,000.00[b]	808,395,200	2,961.25	4,090.39	784.31	48.00	.....
Nebraska:													
Lincoln	M	No	None	Yes	No	No	Ap. 1,500.00	1,972,000,000	Ap. $1,200	Ap. $200	None	.....	.....
New Hampshire:													
Dover	M	Yes	Slow sand	Yes	No	No	.....	.....	.....	.....	.....	.....	.....

WATER PURIFICATION

New Jersey:													
Dover	M	No	None	Yes	No	No	800.00	25,279,200	25.50	40.00	3.40	None	None
New York:													
Avon	M	No	None	Yes	No	Screen	1,500.00	40,000,000	100.00	39.00	None	None	.....
Binghamton	M	Yes	Rapid sand	Yes	No	Rarely feed lime water	.....	2.5 billion	4,800.00	8,500.00	250.00	.....	None
New York	M	No	None	Yes	No	Copper sulphate	.....	250,000,000	.....	62,000.00	.....	.....	.....
Ossining	M	No	None	Yes	No	Copper sulphate	.....	.....	.....	.....	.....	.....	.....
Watertown	M	Yes	Slow sand	Yes	Yes	No	.....	1,616,454,000	.....	.....	.....	.....	.....
Waverly	M	No	None	No	No	Copper sulphate	.....	.....	.....	.....	.....	.....	.....
Yonkers	M	No	Slow sand	Yes	No	No	796,625.59	3,095,673,200	44,733.76	887.58	.....	84,470.25	.....
North Dakota:													
Wahpeton	M	Yes	Sand	Yes	No	No	24,000.00	132	5,600.00	1,200.00	100.00	.....	.....
Ohio:													
Akron	M	Yes	N. Y. Continental Jewell rapid sand	Yes	No	.....	1,400,000.00	6,000,000,000	20,000.00	27,000.00	500.00	1,800.00	.....
Bowling Green	P	No	None	Yes	No	No	.....	.....	.....	23.00	12.00	None	None
Cleveland	M	No	36 rapid sand	Yes	No	No	2,250,000.00	34,120,000,000	68,004.40	52,595.51	.....	?	None
Columbus	M	Yes	Mechanical	Yes	Yes	No	890,000.00	8,030,000,000	51,800.00	170,000.00	7,200.00	.....	12,300.00
Dayton	M	No	None	Yes	No	No	.....	.....	.....	.....	.....	.....	.....
Defiance	M	Yes	Rapid sand	Yes	Lime only	Carbonate of lime	270,000.00	215,165,750	.....	.....	.....	.....	.....
Dennison	P	Yes	Mechanical	Yes	No	.....	Ap. 50,000.00	824,000,000	1,312.19	2,811.84	885.71	21,213.12	228.89
Eaton	M	Yes	Rapid sand	Yes	No	No	30,000.00	4,900,000	.....	450.00	150.00	.....	.....
Oberlin	M	Yes	Excelsior strainers	Yes	Yes	No	.....	110,000,000	360.00	2,795.00	252.64	100.00	.....
Wadsworth	M	Yes	Gravity sand	No	No	No	70,000.00	.....	.....	.....	128.72	.....	.....
Oklahoma:													
Cushing	M	Yes	None	Hypocho. of lime	Only during turbidity	Lime and iron sulphate	30,000.00	70,000,000	..... 2,400.00	1,200.00 468.00	50.00 424.00	85.00 2,352.00	....
Hominy	M	Yes	Sand	Yes	No	.....	1,700.00	60,000,000	300.00	308.50	75.00	None	.....
Oregon:													
Ashland	..	No	None	Yes	No	No							
Eugene	M	Yes	Rapid sand	Yes	No	No	$23,000.00	456,000,000	5,800.00	850.00	None	1,300.00	None
Marshfield and North Bend	P	..	.....	Yes	..	.....	.....	900,000 per day	.....	.....	.....	.....	.....
Pennsylvania:													
Chester	P	Yes	Gravity rapid sand	Yes	No	Aeration	216,000.00	2,448,000,000	7,770.00	6,600.00	720.00	None	670.00
Coatesville	M	No	Slow sand and pressure	Yes	No	.....	.....	18,000,000.00	5,508.00	270.00	500.00	3,185.00	2,909.00[e]
Corry	..	No	None	Yes	No	Copper sulphate	7,000.00	300,000,000	.....	37.50	200.00	None	.....
Freeland	P	No	None	Yes	No	No	None	.....	Elec. power	.....	.....	.....	.....
Pittsburgh	M	Yes	56 acres slow sand filters	Yes	No	No	6,990,751.13	37,789 750,000	147,074.52	2,618.31	780.04	.....	11,063.38[f]
Uniontown	P	No	None	Yes	No	No	.....	356,639,040	.....	107.11	2.95	None	360.00[d]
Tennessee:													
Greenville	M	No	None	Yes	No	No	.....	.....	.....	40.00	None	None	None
Texas:													
Corpus Christi	M	Yes	Pittsburgh	Yes	Partly	Alum and lime	Ap. 200,000.00	300,000,000	.....	.....	.....	.....	.....
Dallas	M	Yes	Sand and coal	Yes	Yes	Alum and lime	385,000.00	ap. 14,000,000,000	.....	.....	.....	1,000.00	.....
Lockhart	P	No	None	Yes	No	No	None	45,000,000	None	75.00	25.00	.....	50.00
Washington:													
Bellingham	M&P	..	None	Yes	No	No	1,719.92	6,000,000 daily	.....	1,000.00	12.05	1,800.00	240.00[e]
Seattle	..	No	None	Yes	No	No	.....	60,000,000 daily	None	6,500.00	.....	.....	.....
Walla Walla	M	No	None	Yes	No	No	.....	.....	.....	.....	.....	.....	.....
Wisconsin:													
Appleton	M	Yes	Rapid sand	Yes	No	Aeration and copper sulphate	645,313.87	523,940,000	5,600.00	1,996.83	852.92	2,072.11	.....

[a]—Amount filtered; 98,000,000 gallons chlorinated. [b]—Cost in 1915. [c]—High-pressure booster pump power. [d]—For chemical analyses. [e]—Bacteriological examination monthly at $20. [f]—Total cost, $161,536.

Recent Legal Decisions

CONCLUSIVENESS OF ENGINEER'S ESTIMATE OF EARTH EXCAVATED

The Kansas Supreme Court holds, Wilson v. Drainage Dist. No. 2, 213 Pac. 635, that the following language in a contract for the construction of a ditch did not make the engineer's estimates of the amount of earth excavated conclusive: "The engineer shall in all cases determine the quantities of the several kinds of work to be paid for under this contract, and he shall decide all questions as to lines, levels, etc. Any doubt as to the plans and specifications will be explained by the engineer, and his interpretations shall be final and binding upon the parties hereto."

DEPOSIT ON BID FOR STATE HIGHWAY CONSTRUCTION IN EXCESS OF STATUTORY AMOUNT

Contractors bidding for state highway construction work deposited a larger sum than that required by the Washington statute, Rem. Comp. Stat. §6767, which provides for a deposit equal to 5 per cent. of the bid, to be forfeited if the successful bidder fails to enter into a contract and furnish a bond. They afterwards sought to be relieved from their bid on the ground of mistake, and to recover the deposit. The Washington Supreme Court holds, Harrington v. Davis, 213 Pac. 449, that the burden of proof of the mistake was on the contractors, but that a judgment forfeiting the sum deposited in excess of 5 per cent. of the bid was error.

CONTRACTOR HELD LIABLE FOR DEFECTS IN FLOOR OF PUBLIC BUILDING

Specifications prepared by the state architect for the construction of a public building, and forming part of the construction contract, required that certain cement floors be finished according to the master builder's process, with material and by workmen furnished by a designated company, not the contractor. The specifications further required, in effect, that the finish be one-half of an inch in thickness, to bring the floors up from the concrete slab to the specified floor level. The designated company furnished material and workmen to finish the floors, but the workmen applied merely a "skim," in some places thicker than others, but generally of eggshell thickness only. As a result, the floors were uneven and full of waves, cracked and broke through when tapped or stepped on, and had holes in them. In mandamus for delivery of warrants issued for the work, the Kansas Supreme Court holds, Heman Const. Co. v. Mason, 212 Pac. 1089, that the contractor was responsible for the defects. Delivery of the warrants was withheld until the contractor should remedy these defects, which he never did. It is held that the state was entitled to have the warrants canceled.

HIGHWAY CONTRACTOR SHOULD ADVISE CEMENT COMPANY WITHIN REASONABLE TIME IF CEMENT BELOW STANDARD STRENGTH

Where cement ordered by contractors for use in highway construction was claimed by them to be below the standard of strength, the Michigan Supreme Court holds, People v. Alpha Portland Cement Co., 192 N. W. 787, that it was the duty of the contractors so to advise the cement company within a reasonable time if they desired to escape payment for it. This they did not do, although notified by the state highway commission that a portion of a consignment had failed to meet the test as to tensile strength. Instead, they retained and used this carload the same as the rest without complaint or notice to the cement company for over two years after being advised by the state, and not until sued for its value. It was held they must be deemed to have affirmed its previous acceptance when they O. K.'d the original invoices.

PARTIES DEALING WITH MUNICIPALITY MUST KNOW EXTENT OF OFFICERS' POWERS

Parties dealing with a municipal corporation are bound to know the extent of the powers lawfully confided to the officers with whom they are dealing in behalf of such corporation, and they must guide their conduct accordingly; and an agreement, not authorized by ordinance or charter, between a city council and one who had advanced money to those who wished to get jitney licenses that on the surrender of the licenses the unused portion was to be refunded, was beyond the council's powers and unenforceable against the city. Bittick v. City of El Paso (Texas Civil Appeals), 247 S. W. 892.

SUFFICIENT DESCRIPTION IN PETITION TO ESTABLISH HIGHWAY

The Texas Commission of Appeals holds, in Haverbekken v. Coryell County, 247 S. W. 1086, that while, in jurisdictional matters relating to the location of a highway, the provisions of the statute must be complied with, substantial compliance is all that is required. Technical precision is not required in designating the termination of a proposed road. If the description is such that the termination designated therein can be located with reasonable certainty by persons familiar with the locality, and such that it can be located, if necessary, by a surveyor by applying the description found in the petition to the situation found on the ground, it will be deemed sufficient.

INCH-FOOT CHARGES ON DISTRIBUTION MAINS

The New Jersey Board of Public Utility Commissioners in Commonwealth Water Co. v. City of Summit, October 5, 1922, modified a rule requiring a municipality to pay inch-foot charges on all water main extensions, by a provision that no main of less than 6 inches in diameter should be deemed to be a distribution main unless so ordered by the board.

NEWS OF THE SOCIETIES

CALENDAR

Jan. 15-17—NATIONAL CRUSHED STONE ASSOCIATION. Annual convention at Chicago. Secretary, A. P. Sandles.

Jan. 15-18 — AMERICAN ROAD BUILDERS ASSOCIATION. Annual convention, Chicago. Secretary, E. L. Powers, 37 West 39th St., New York City.

Jan. 17-18—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting, 29 West 39th Street, New York City. Secretary, John H. Dunlap.

Jan. 18-20—AMERICAN CONCRETE PIPE ASSOCIATION. Annual Convention, Chicago, Ill. Secretary, M. L. Loving, 111 West Washington St., Chicago, Ill.

Jan. 20—TEXAS WATER WORKS ASSOCIATION. Annual Convention, Dallas, Texas. Secretary, V. M. Ehlers, Austin, Texas.

Jan. 22-26—AMERICAN CONCRETE INSTITUTE. Annual convention. Cincinnati. Secretary, Harvey Whipple, 1807 East Grand Boulevard, Detroit, Mich.

Jan. 23-25—ILLINOIS SOCIETY OF ENGINEERS. Annual meeting at Peoria. Secretary, E. E. R. Tratman, Wheaton, Ill.

Jan. 23-26—IOWA ENGINEERING SOCIETY. Annual Meeting in Des Moines. Secretary, Lloyd A. Canfield, 406 Flynn Building, Des Moines.

Jan. 24—BOSTON SOCIETY OF CIVIL ENGINEERS. Meeting, Boston, Mass. Secretary, J. B. Babcock, Tremont Temple, Boston.

Jan. 25-26 — SOUTH ATLANTIC COASTAL HIGHWAY ASSOCIATION. Meeting at Charleston, S. C. Secretary, A. V. Snell, Jacksonville, Fla.

Jan. 27—NORTHEASTERN SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting, Boston, Mass.

Jan. 30-Feb. 3—ASSOCIATED GENERAL CONTRACTORS OF AMERICA. Annual meeting, Los Angeles, Calif.

Feb. 13—NEW ENGLAND WATER WORKS ASSOCIATION. Regular meeting, Boston. Secretary, Frank J. Gifford, Tremont Temple, Boston.

Feb. 21 — BOSTON SOCIETY OF CIVIL ENGINEERS. Symposium on Pavements. Boston. Secretary, J. B. Babcock, Tremont Temple, Boston.

May 7-9—AMERICAN ASSOCIATION OF ENGINEERS. Ninth annual convention, Norfolk, Va. Secretary, C. E. Drayer, Chicago.

May 21-25 — AMERICAN WATER WORKS ASSOCIATION. Annual convention. Statler Hotel, Detroit, Mich. Secretary, John M. Diven, 152 West 71st Street, New York City.

June 15—TEXAS WATER WORKS ASSOCIATION. Joint Convention with Southwest Water Works Association, Wichita Falls Texas. Secretary, V. M. Ehlers, Austin, Texas.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention. Memphis, Tenn. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. — OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

IOWA ENGINEERING SOCIETY

The annual meeting of the Iowa Engineering Society will be held at the Chamberlain Hotel, Des Moines, on January 23 to 26. The Drainage Section has a technical program for Tuesday afternoon. Wednesday morning will be a general session, with the president's address. Wednesday afternoon the Drainage, Highway, Mechanical-Electrical, Municipal, Railroad, and Structural-Architectural Sections will carry out technical programs. Wednesday evening there will be an entertainment. Thursday morning and afternoon will be devoted to business sessions. Thursday evening will be the annual banquet, and Friday morning there will be a general program.

CITY MANAGERS ASSOCIATION

At the ninth annual convention of the City Managers Association, which was held in Kansas City, the Tuesday afternoon session was devoted to papers dealing with municipal taxation, including those by George Garrett, city manager of Junction City, Colorado, and Clarence Palmer, tax expert of Kansas City. E. J. Fort, city manager of Niagara Falls, discussed at length the assessment of special benefit for sewer projects. This was followed by a discussion of occupational and licensed taxes as a source of municipal revenue, which was led by Ossian A. Carr of Dubuque. G. A. Bingham, city manager of Lima, Ohio, read a paper on additional revenues. In the evening Governor Henry J. Allen addressed the convention on municipal government.

The Wednesday morning session was devoted to discussion of law enforcement and public recreation, the former by Allison A. Neel, vice-president of the Kansas City Law Enforcement Association. The question of public recreation was discussed by L. A. Halbert, executive secretary of the Council of Social Agencies of Kansas City. The afternoon session was devoted largely to city planning and zoning and municipal tourists' camps. The former subject was discussed by Robert P. Woods, a member of the City Planning Commission of Kansas City. The tourists' camp question was discussed more vigorously than any other during the convention. Earl C. Elliott, city manager of Wichita, considered the municipal tourists' camp as an unnecessary and unwarranted expenditure, while J. S. Adsit, president of the Good Roads Association of Greater Kansas City, argued in favor of the camp, as did a majority of the speakers following. On Wednesday evening a banquet was held, at which Prof. C. E. Fassett spoke on "Modern City Charters" and Prof. H. Reed on "The College Training of Municipal Experts."

On Thursday morning officers were chosen for the following year and the city selected for the next convention. The officers selected were: President, Louis Brownlow, of Petersburg, Pa.; Vice Presidents, R. B. Rigsby, of Durham, N. C., and I. C. Brower, of Pasadena, Calif.; Executive Secretary, John G. Stutz, of Lawrence, Kansas (also secretary-treasurer of the League of Kansas Municipalities). Since January 1, 1923, the office of the City Managers' Association has been at Lawrence, Kansas.

Washington, D. C., was chosen for the 1923 convention, which will be held on November 13 to 15.

At the final session on Thursday afternoon, Delos Wilcox debated in the affirmative and Paul Haynes in the negative on the question, "Resolved: That Municipal Ownership of Public Utilities in City Manager Cities is Desirable."

WEST VIRGINIA ROAD BUILDERS ASSOCIATION

Advantage was taken of the presence of road contractors in Charleston, West Virginia, on December 19, to bid upon road work for the state highway commission, to perfect an organiation to be known as the West Virginia Road Builders' Association. John R. Kennedy, of the Kennedy Construction Company, of Parkersburg, was elected president, and E. C. Smith of Parkersburg, secretary.

DAYTONA CONFERENCE ON MOSQUITO CONTROL

A conference on mosquito control work was held in Daytona, Florida, December 6 and 7 and was attended by about 150 delegates from all sections of the state, making this conference a historic event for Florida, in the opinion of George W. Simons, Jr., the chief sanitary engineer of the state. At this conference there was organized the Florida Anti-Mosquito Association, with Col. Joseph Y. Porter, dean of health workers of the state and for twenty-seven years state health officer, as president of the society, and Mr. Simons as secretary.

For several months previous Mr. Simons had been arousing interest in the anti-mosquito campaign throughout the state both by personal visits and by letters, newspaper items, etc. The principal speakers were Wilbur M. Walden, assistant entomologist of the New Jersey Agricultural Experiment Station, whose enthusiastic presentation of the subject made a hit with the audience and who laid special emphasis upon the economic features of mosquito control. Col. Porter also gave some very practical, commonsense suggestions. J. H. Scales of Perry stated that the $30,000 invested in mosquito control in that town of 1,900 population had made it the healthiest town in Florida and had returned 1,000 per cent in improved labor efficiency and better health. Sixteen chambers of commerce were represented at the conference and delegates were present from the U. S. Public Health Service. The major railroads operating in the

state also were well represented, realizing the economic value of mosquito control to the state.

Delegates were apparently convinced that economic losses from mosquitoes in Florida were far too great and that the expenditure in mosquito control would be well worth while. Most of the delegates returned to their home towns resolved to see that these towns undertake mosquito control work as a regular routine practice and that the councils make provisions for such work. Within three weeks after the meeting the State Board of Health received applications from six cities desirous of including mosquito work in their 1923 budgets and of having the necessary surveys made as a guide to control work.

AMERICAN ASSOCIATION OF ENGINEERS

A Committee of the American Association of Engineers on Services and Fees of Practicing Engineers this year is taking up specific problems. L. E. Ayres as chairman has outlined the following program of work, approved by the Board of Directors:

Rules of practice assigned to subcommittee No. 1, with the idea of having rules prepared by engineers of high standing and repute, that when completed they may be recognized as fully as important an achievement as the code of ethics prepared by the late Isham Randolph, published by the Association. The committee is made up of the following: Henry E. Riggs, chairman; George W. Fuller, C. W. Hubbell and Daniel W. Mead.

Extending and elaborating the schedule of fees prepared heretofore by the general committee will be assigned to a second sub-committee with H. S. Kleinschmidt as head.

The study of problems arising out of the practice of public employees engaging in private practice will be the duty of sub-committee No. 3 with W. A. Artingstall as chairman.

With J. W. Cunningham as chairman, Sub-Committee No. 4 will investigate problems involved in connection with the federal government taking over in increasing measure engineering service, giving special thought to the engineering staff of the U. S. Reclamation Service.

WICHITA FALLS TECHNICAL CLUB

A technical organization has been formed in Wichita Falls, Texas, with eighty-five charter members in its membership, composed of civil, electrical, mechanical and chemical engineers, geologists, architects, contractors and public utility men. The following officers were elected: President, Julian Montgomery; first vice-president, R. A. Thompson; second vice-president, A. M. McPherson, and secretary-treasurer, A. H. Douglas.

A. G. C. CONVENTION

Upon the conclusion of the Good Roads Show on January 21st the members of the Associated General Contractors will assemble in Chicago and leave for the Los Angeles convention via the Atchison, Topeka & Santa Fe Railway at 6 P. M. Enroute to Los Angeles a stop will be made at the Grand Canyon. The delegation will arrive in Los Angeles January 29th. A choice of three routes will be permitted for the return trip including stops of interest. Full particulars including schedules, railway fares, etc., can be secured by communicating with the Associated General Contractors, Munsey Building, Washington, D. C.

ASSOCIATED GENERAL CONTRACTORS' NEW PRESIDENT

On December 12th, at a special meeting in Washington of the Board of Directors of the Associated General Contractors, John W. Cowper, president of the John W. Cowper Company of Buffalo, was nominated to fill the presidential vacancy arising through the accidental death of the previously elected president, W. E. Wood, of Detroit, Michigan. Mr. Cowper is a member of the A. G. C. Advisory Board, chairman of the Committee on Contracts and Vice-Chairman of the Joint Conference on Standard Construction.

AMERICAN CONCRETE INSTITUTE

January 22-25 has been selected as the date for the Annual Convention of the American Concrete Institute, to

(*Continued on page 26*)

take place at the Hotel Sinton, Cincinnati, Ohio, where an unusually interesting program is promised.

A special meeting Monday, Jan. 22nd, at 2 P. M. on Concrete Products Manufacture will continue on into the evening program. Meetings will take up Tuesday, Wednesday and Thursday, outside of a social get-together evening Wednesday.

The following papers are included in the program: "Methods of Making Concrete Pressure Pipe," W. G. Chace, of the Lock-Joint Pipe Company; "Design and Construction Features of the Ideal Section of the Lincoln Highway," by W. G. Thompson; "Trend of Design and Construction of Concrete Roads," by H. Eltinge Breed; "Correction Data for Comparative Test Results from Field Specimens," by G. W. Hutchinson; "Effect of Impure Water on the Strength of Concrete," by Prof. Duff A. Abrams; "Design of Elastic Structures from Paper Models," by Prof. George E. Beggs; "An Interesting Case of Dangerous Aggregate," by J. C. Pearson; "Thoughts on Concrete Houses," by J. C. Pearson; "Developments in Surface Treated Concrete," by R. F. Havlik; "Some Defects in Concrete Buildings," by H. C. Loring; "Inundation Methods for Measurement of Sand in Making Concrete," by W. A. Slater and G. A. Smith, of the U. S. Bureau of Standards; "Analysis of the Variables in Concrete from the Construction Standpoint, with Some Results of Job Tests," by W. P. Bloecher, of Stone & Webster; and "Causes of Steel Corrosion and Concrete Disintegration and Methods of Their Prevention," by M. M. Upson.

There will also be the usual presentation of specifications, and this year, there being a number of great importance, one whole session will be devoted to a question box, and already a number of highly important questions have been submitted.

SAN FRANCISCO SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS

At the annual meeting held on December 19th of the above society, Frank G. White, chief engineer, state board of harbor commissioners, read a paper entitled, "The China Basin Terminal." The following officers were elected for the ensuing year: George A. Elliott, chief engineer, Spring Valley Water Company, president; H. H. Wadsworth, consulting engineer, vice-president; Henry D. Dewell, consulting engineer, secretary-treasurer.

ASSOCIATED ENGINEERING SOCIETIES OF ST. LOUIS

In connection with the proposed $88,000,000 bond issue at St. Louis. Mo., and as an aid to advising the public of the needs of the works for which the bonds are designed to secure, the Associated Engineering Societies of St. Louis have arranged for a number of short addresses to be delivered by engineers most intimate with the various subjects allotted. These addresses will begin in January so as to afford ample time before the public vote on the bond issue, which is to take place February 9th.

As a further aid, a pamphlet giving in detail the items of bond issue and distribution of cost has been prepared by a special committee, organized by the Chamber of Commerce, with Baxter L. Brown, as consulting engineer, at its head.

NEWS OF THE SOCIETIES

CALENDAR

Feb. 21 — BOSTON SOCIETY OF CIVIL ENGINEERS. Symposium on Pavements. Boston. Secretary, J. B. Babcock, Tremont Temple, Boston.

Mar. 21 — BOSTON SOCIETY OF CIVIL ENGINEERS. Seventy-fifth annual meeting, Boston City Club. Secretary, J. B. Babcock, Tremont Temple, Boston.

Mar. 21-22 — ILLINOIS SECTION, AMERICAN WATER WORKS ASSOCIATION. Fifteenth annual meeting, Decatur, Ill. Secretary, G. C. Habermeyer, Urbana, Ill.

May 7-9—AMERICAN ASSOCIATION OF ENGINEERS. Ninth annual convention, Norfolk, Va. Secretary, C. B. Drayer, Chicago.

May 21-25 — AMERICAN WATER WORKS ASSOCIATION. Annual convention, Statler Hotel, Detroit, Mich. Secretary, John M. Diven, 152 West 71st Street, New York City.

June 15—TEXAS WATER WORKS ASSOCIATION. Joint Convention with Southwest Water Works Association, Wichita Falls, Texas. Secretary, V. M. Ehlers, Austin, Texas.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Memphis, Tenn. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. — OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

NEW ENGLAND WATER WORKS ASSOCIATION

The annual meeting of the New England Water Works Association was held at the Boston City Club on January 9th. The secretary reported 109 in attendance.

The committee on revision of the constitution consisting of Samuel E. Killam as chairman, Frank J. Gifford and Reeves J. Newsom presented its report and after a few minor changes the new constitution as recommended was adopted. The most important changes are those relating to classes of members and the date of annual election. Officers will be elected at the convention in September, nominations made by a nominating committee being mailed to the members on or before June 15th and printed letter ballots sent on or before August 1st. In addition to the present classes of membership, three new classes are provided for—life members, junior members and corporate members. The first is provided for those whose services to the association entitle them to special recognition. Juniors are those not less than 18 nor more than 25 years old who are students in engineering schools or connected with some branch of engineering or water supply work. Corporate membership is provided for water boards, commissions or companies.

The officers elected for the coming year are as follows: President, Percy R. Sanders of Concord, N. H.; vice-presidents, George A. Carpenter, Reeves J. Newsom, David A. Heffernan, Frank E. Winsor, Theodore L. Bristol and Vernon F. West; secretary, Frank H. Gifford; treasurer, Frederick L. Winslow; editor, Henry A. Symonds; advertising agent, Fred O. Stevens.

Papers were read by William Wheeler on "Cement for Water Pipe Joints" and by Vernon F. West entitled "Some Costs of Lead Substitutes in Pipes." The committee on revision of standard specifications for castiron pipe submitted a report, which was accepted as a report of progress, telling of tests made on strength of pipe, chemical requirements, pipe coatings, etc. The report of the committee on financing municipal water works was presented by Leonard Metcalf in the absence through sickness of Chairman Bertram Brewer, telling of a hearing held at the State House on Dec. 27th, last, as a result of which it was recommended that a bill be introduced to change the present laws which place a 5-year limit on loans (see "PUBLIC WORKS" for January, 1923). The committee was continued and authorized to draw up such a bill.

This society, as have others recently, has found that committees were accumulating to an unnecessary number and the executive committee recommended reducing the number by eliminating thirteen of the twenty-two now existing.

MINNESOTA FEDERATION OF ARCHITECTURAL AND ENGINEERING SOCIETIES

The second joint annual convention of the Minnesota Federation of Architectural and Engineering Societies and the Minnesota Surveyors and Engineers Society will be held on Feb. 21st to 23rd at the St. Paul Hotel, St. Paul, Minnesota.

The Wednesday morning session will open at 10.30 with the president's address and report of officers and committees of the Federation. In the afternoon O. L. Kipp will read a paper on "Economic Highway Construction," and "Cement Materials in Minnesota" will be discussed by W. R. Emmons and E. S. MacGowan, and "Filtration" will be discussed by A. F. Mellen and J. W. Kelsey. There will be an informal gathering in the evening. Thursday morning there will be papers on "City Planning" by A. C. Godward and G. H. Herrold, one on "Wood Wastes" by Prof. F. R. Mann, one entitled "Looking Backward and Forward" by Prof. G. D. Shepardson, and another entitled "The Development of Power in Agriculture" by Prof. William Voss. The afternoon will be devoted to a business meeting and the evening to a banquet.

The Minnesota Surveyors and Engineers Society will hear its president's address and report of officials Wednesday morning and during the rest of that day and Thursday will join with the federation in the program given above. On Friday sectional meetings will be held by the Highway Section, the Drainage Section and the Municipal Section. The Highway papers listed are as follows: "Marl for Road Surfacing on Sandy Soil" by Charles H. Dow; "Suggested Methods for the Analysis of Subgrade and Gravel as a Guide for the Selection of Surfacing Material" by F. C. Lang; "How, Where and When Should the Engineer Look for Gravel and Other Surfacing Material?" by C. A. Motl; "General Conclusions Regarding Data Obtained from the Bates and Pittsburgh Test Roads," by E. O. Hatheway; "Snow Removal Methods," by P. D. Mold; "Methods of Extending County Aid to Townships and Results Obtained on Construction and Maintenance," by J. F. O'Meara; "Marking County Highway Systems," by J. A. Myron; "The Contractor's Point of View on the Classification of Excavation Material and Other Features of Engineering Supervision," by J. C. Baxter; "Bridge Maintenance," by E. J. Miller.

The papers before the Drainage Section are as follows: "What We Have Learned From a Scientific Investigation of Lakes and Streams and Its Bearing on Drainage in Minnesota," by T. Surber; "The Problem of Better Tile," by D. G. Miller; "Slate Inspection of Drain Tile" by E. V. Willard; "Special Uses for Improved Wet Lands," by Col. J. T. Stewart; "The Wisconsin Farm Drain Law," by James King; "Report of Legislative Committeee," by G. P. Smith.

The papers before the Municipal Section are as follows: "The Disinfection of Wells, Reservoirs and Distribution System to Remove Indications of Contamination," by O. E. Brownell; "Fire Prevention Inspection Service," by George H. Nettleton; a debate on the subject, "Resolved: That Municipal Contracting Throughout the State is so Conducted that the General Clauses to which Contractors Object as Being Unfair Cannot be Eliminated if the Public Welfare is To Be Properly Safeguarded." Affirmative, Frank McKellip; Negative, Frank E. Fraser. "Standardization of Contracts for Engineering Services," by Thomas H. Curtis; "Garbage Disposal in Small Cities and Villages," by F. D. Minium.

AMERICAN WATER WORKS ASSOCIATION

The nominating committee has submitted for the respective offices for the year 1923-1924 the following names: For president, George W. Fuller; for vice-president, Frank C. Jordan; for treasurer, William W. Brush; for trustees, District No. 2, Charles R.

Bettes; District No. 5, Edward E. Wall.

If no other nominations are made on written request of at least 25 members by March 1 no ballot will be taken and the above will be declared elected.

ILLINOIS SECTION

The fifteenth annual meeting of the Illinois Section of the A. W. W. A. will be held in Decatur, March 21 and 22, 1923. The subjects to be discussed include: Impounded water supplies, water softening, financing public utilities, customer ownership of securities, increasing the use of water, supervision of filtration plants, consolidation of small plants, the fuel problem, advisability of small utilities owning or controlling coal mines.

AMERICAN SOCIETY OF CIVIL ENGINEERS

The annual meeting of this society was held in New York Jan. 17th, 18th and 19th. There was an attendance of more than 1,200 and the meeting was especially notable for the interest in the papers and discussions.

Honorary membership was bestowed upon L. J. Changnaud of Paris, Sir Maurice Fitzmaurice of London, Prof. William C. Unwin of London, Clemens Herschell of New York and John F. Stevens of New York. The Norman medal was awarded to Charles H. Paul for his paper entitled, "Core Studies in the Hydraulic Fill Dams of the Miami Conservancy District"; the J. James R. Croes prize to William Cain for his paper, "The Circular Arch Under Normal Loads"; the Thomas Fitch Rowland prize to Gustav Lindenthal for a paper entitled, "The Continuous Truss Bridge Over the Ohio River at Sciotoville," and the James Laurie prize to A. T. Safford and E. P. Hamilton for the paper, "The American Mixed-Flow Turbine and Its Setting."

The new president is Charles F. Loweth, the vice-presidents are: George H. Davidson and Anson Marston, and Glenn D. Holmes, E. B. Whitman, George F. Fenkel, T. L. Condron, R. N. Begien and George C. Mason were elected directors. 2,581 votes were cast and the lowest received by any of those elected was 2,396, while Mr. Loweth received 2,564, the highest cast for any of those elected.

The Board of Direction of the society at a meeting before the annual meeting of the society, decided to call for another referendum of the members on the question whether the society should affiliate with the Federated American Engineering Societies. With the ballots will be sent to the members arguments for and against the proposition which are to be prepared by two committees, each committee consisting of three directors who personally favor such arguments. The ballots will be mailed to the members on Feb. 15th and canvassed fifty days later. It was decided by the directors, in the interest of economy, to discontinue the publication in a separate pamphlet of the preliminary notice of applications for membership, but to include this in the proceedings. The board selected April 18th, 19th and 20th as the date for holding the spring meeting at New Orleans. It also approved the formation of technical sections on power, highways and irrigation, respectively. One on sanitation has already been provided for.

On Thursday about 700 of those attending the convention visited Bethlehem, Penn., where the principal attractions were the Hill-to-Hill Bridge (work on which, however, had been discontinued because of the freezing weather), the Bethlehem Steel Plant, and the laboratory of Lehigh University. On that evening Julius H. Barnes, president of the Chamber of Commerce of the U. S., addressed the society on the subject, "Transportation Keyed to Production."

A special session was devoted to civil engineering research. Alfred D. Flinn, director of the "Engineering Foundation," described the development of the Foundation and of the Division of Engineering of the National Research Council.

Another session was devoted to city planning in which Nelson P. Lewis, in a paper on "Regional Planning" gave an outline of the physical survey for a plan for New York City and adjoining territory; Morris Knowles discussed the "Principles and Practices of Zoning," and George H. Norton, in a paper entitled, "The Engineer and City Planning," stated that the city planning engineer must, in his plan, appeal to the sound judgment of a large part of the citizens, must cooperate with the public spirited citizens who are ready to assist in laying the matter fully before the whole electorate in such manner as to win their approval, and, when this has been obtained, secure that of the city authorities.

Another session was held jointly with the society for the promotion of engineering education where addresses were delivered by Prof. Charles F. Scott, Prof. William G. Raymond, Magnus W. Alexander and John L. Harrington.

Each of the four new technical divisions met and organized during the convention.

A. S. C. E. LOCAL SECTIONS

The bi-monthly meeting of the San Francisco Section was held on Oct. 15th, preceded by a dinner with 52 present. The Board of Public Works showed two reels of motion pictures of construction on the Hetch-Hetchy project and several sections of the Don Pedro Dam while a member showed slides of irrigation systems in Canada and a representative of the Bureau of Public Roads presented slides of typical highways throughout the United States.

The Atlanta Section held a meeting in Atlanta on Dec. 11th, at which the following officers were elected: President, George B. Slack; First Vice-President, B. M. Hall; Second Vice-President, W. A. Hansell; Secretary-Treasurer, Frederick H. McDonald.

At the December meeting of the Central Ohio Section the following officers were elected: President, George F. Schlesinger; First Vice-President, J. R. Wilbanks; Second Vice-President, C. B. Cornell; Secretary-Treasurer, Alvan B. Tallmadge.

The annual meeting of the District of Columbia Section was held on Dec. 19th and Major M. C. Tyler spoke on "Public Engineering Works Now in Progress in the District." The following officers were elected: President, W. E. Parker; Vice-President, A. N. Johnson; Secretary-Treasurer, J. H. VanWagenen

The Duluth Section held a meeting Nov. 20th, at which E. K. Coe discussed "Paving of Superior Street, Duluth." On Dec. 18th, Past President Clark gave an address on "Fire Prevention" and a discussion was had of the paper by W. J. Knight, sent out by the St. Louis Section, on the subject: "Is the American Society of Civil Engineers a Progressive Institution?" and a committee of three was appointed to study the points brought out and submit a report as quickly as possible.

At the annual meeting of the Iowa Section the following officers were elected: President, W. H. Root; Vice-President, Prof. T. R. Agg; Director, C. H Currie. Papers were read on "Iowa Highway Transportation Problems" by C. C. Coykendall, "Investigations of Theory of Highway Grades" by Prof. Agg, and "Results of Tests of the Bates Experimental Road" by R. R. Benedict.

At the annual meeting of the Kansas City Section the following were elected: President, E. M. Stayton; Vice-President, H. P. Treadway; Vice-President to serve out Mr. Stayton's unexpired term, Wynkoop Kiersted; Secretary-Treasurer, Henry C. Tammen. The secretary reported 76 members..

The Kansas Section at its annual meeting elected as president Con M. Buck and as vice-president H. A. Rice.

The Lehigh Valley Section has elected as president E. H. Shipman; as vice-presidents, B. C. Collier and F. O. Dufour, and as secretary-treasurer, M. O. Fuller.

At the December meeting of the Philadelphia Section the subject of "City Planning" was considered, with addresses by Nelson P. Lewis, Milton B. Medary, Jr., John A. Fogleson and others.

ASSOCIATED GENERAL CONTRACTORS

The fourth annual convention of the Associated General Contractors of America was held in Los Angeles Jan. 29th to Feb. 2nd. The general headquarters was at the Hotel Clark and the convention sessions were held at the Philharmonic Auditorium. On Monday the Executive and Advisory Boards met in the morning and in the evening attended an invitation dinner at the Los Angeles University Club, accompanied by the executive staff and the chapter presidents. On Monday afternoon there was a reception for delegates and guests in the ballroom of the Hotel Clark.

Tuesday morning's session opened with an invocation by Right Rev. Dean William McCormack. Mayor Cryer welcomed the delegates and Sumner Sollitt delivered a eulogy of the late W. E. Wood who was to have been the 1923 president of the society.

In his annual address the president, Arthur S. Bent, atrributed the development of Los Angeles into a modern industrial manufacturing commmunity to "industrial freedom" established therein. He said: "For twenty-five years we have maintained it without a break. Every workman in the land, union or non-union, knows that here he is sure of his opportunity to work where and when he will, without interference. Every employer and investor is assured of his opportunity to conduct his own business in his own way, without interference. We are not against unions. We are for industrial freedom and that individual 'fair chance' which Secretary Hoover declares is today the sole chance of further human progress." Following Mr. Brent's address, D. A. Garber presented the report of the Committee on Investigating War Indictments and Suits, which upheld the wisdom of the form of contract adopted by the Committee against whom the indictments were brought, which contract formed the principal basis of such indictment, and asserted that in case of another emergency such as that of 1917 the same form of general contract should be used unless the Government should conscript labor and capital.

The general manager, R. C. Marshall, Jr., then presented the annual report of the Executive Board. In the afternoon the treasurer and Finance Committee and the Membership Committee presented their annual reports, an extended discussion of methods of payment of dues coming between the two reports.

The membership of the society was reported to have increased from 1054 to 1404, 525 new members having been added and 175 members lost. Thirteen chapters were added to the twenty at the beginning of the year.

An address entitled, "New Developments Combining Finance and Surety Affecting Contractors" was delivered by Guy LeRoy Stevick, in which he stated that the contractor's surety gets 1½% of the contract price and may be called a limited partner. Also, the average contract is financed outside of the actual capital of the contractor to about 15%, giving, at 7% interest, 1% of the contract price, which represents the banker's interest, as compared to a little more than 5% net profit to the contractor. This report was followed by the reports of the Legislative and Publicity Committees and a lengthy discussion of the usefulness of the Association periodicals.

Wednesday morning reports were submitted by committees on Ethics, on Methods, and on Labor, and an address on "The Skill Element in the A. G. C. Slogan" by E. J. Mehren. Mr. Greensfelder, chairman of the Committee on Methods, emphasized the need for increasing the length of working season and asked for suggestions on how this could be done. Among the suggestions he offered were planning the work in advance, winter discounts by railroads, use of caterpillars in wet weather when ordinary wheel vehicles could not work satisfactorily, etc. In the matter of labor, it was reported that because of its high cost, labor turnover should be minimized as much as possible and authority should not be given to the average foreman to discharge workmen, but discipline should be maintained instead of by transfer and suspension.

There was an extended discussion on the matter of quantity surveys. W. F. Tubesing described the quantity survey plan supported by sixteen Milwaukee contractors, where a central bureau compiles and tabulates masonry and concrete quantities in order to protect the members from the results of errors made in estimating these individually.

Wednesday afternoon and evening were devoted to an automobile trip and other social events.

Thursday morning three division meetings were held, the Building Division, Highway Division and Public Works and Railroad Divisions combined. In the first, F. J. Twaits read a paper entitled, "Architects as General Contractors," in which he stated that the architect informed the owner what to get while the contractor showed him how to get it. A code of practice to govern relations between architects, contractors, sub-contractors and material dealers was discussed, including the question of admitting these into membership in the society, the majority apparently favoring permitting architects who also acted as contractors to join the society.

In the Highway Division Walter Gillette discussed, "Public Works by Day Labor," and W. F. Creighton the subject of "Contracts." Mr. Gillette believed that contractors should endeavor to inform the public on the wastefulness of performing public works by day-labor, believing that if newspapers obtained and published the facts, the public would prevent continuance of the practice. Mr. Creighton complained of the difficulty of working under such public works contracts as are commonly encountered and urged that further efforts be made between contractors and engineering societies to work out more equitable contracts. Instances were cited where contractors had been prevented from doing highway work in certain states because of contract provisions, South Dakota being cited especially.

In the Public Works Division "Continuous Lettings" was discussed by A. F. Johnson, while in the afternoon J. B. Lippincott read a paper on "The Future of Water Power Development," postponed from the morning program. Louis C. Hill read a paper on "Hydro-Electric and Hydraulic Power Development in the West". Rome H. Schaffner spoke on "Wholesale Markets" and Thomas Haverty on "Immigration."

In the afternoon the Building Division was addressed by Sam Hotchkiss on "Consolidation of Crafts in the Building Trades," while W. A. Simpson discussed "Elimination of Irresponsible Builders." During both sessions the matter of "Quantity Surveys" was discussed at some length and quite generally, and in the afternoon the chair appointed a committee of three to submit to the Committee on Methods details of a quantity survey plan which might be most generally useful to the members of the society, Messrs. W. F. Tubesing, J. G. Tidwell and W. F. Creighton being appointed.

Mr. Simpson said that many bonding companies do not investigate the judgment and skill of a contractor but only his financial standing and honesty, and he suggested trying to get the bonding companies to raise the requirements, especially in those sections where the law requires giving the contract to the lowest bidder. It was suggested that the contractor might justly safeguard his own interest by requiring the owner to give a bond guaranteeing payments according to the contract.

Officers of the Building Division for 1923 were elected as follows: Chairman, Col. J. R. Wiggins; Vice-Chairman, W. F. Creighton. In the Highway Division L. L. Rogers was elected chairman and N. F. Helmers vice-chairman. In the Railroad Division Charles B. Burkhardt was elected chairman and R. A. Schaffner was

(Continued on page 28)

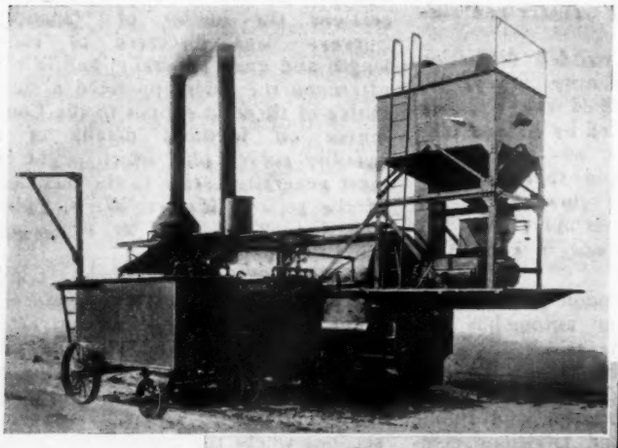
New Appliances

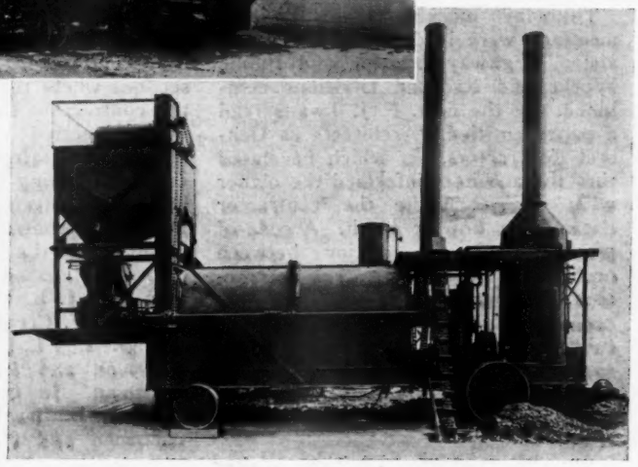
Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

AUSTIN ASPHALT PLANT

The Austin Asphalt Plant, which has been submitted to a test of a year or more at Topeka, Kansas, is said to contain a number of innovations which make it the last word in this class of paving machinery. It is a portable unit consisting of three pieces; namely, the drying and power plant, and two asphalt kettles. It has a capacity of from 1,000 to 1,400 square yards of 2-inch asphalt top per eight-hour day. The sand dryer will handle 120 tons of sand at 350° F., not to contain more than 2% moisture, and is considered one of the special features of the plant. Three drums are built into one unit equal to a single continuous drum 4 ft. 3 in. in diameter by 40 ft. 8 in. long, giving an area of 438 square feet of heating surface. The drum makes eight revolutions per minute, and it requires four minutes for the material to travel through the drums, so that the sand must come in contact with 12,912 square feet of heating surface.

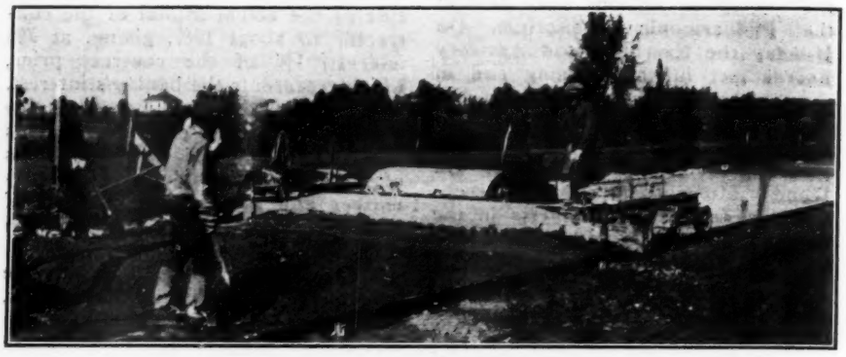
The kettles have a total capacity of 2,500 gallons. They are heated by steam through jointless coils which prevents any possibility of damage to the asphalt such as may happen when kettles are heated by open fire. The pug mill of 1,000 lbs. capacity is chain driven and discharges through a sliding gate in the bottom. Extra large steam jacketed steam piping is used throughout. Air is used to agitate the asphalt. The hot sand bin has three compartments with a capacity of ten tons. The plant is manufactured by the Austin Machinery Corporation.





AUSTIN ASPHALT PLANT

Two views of the plant, the two asphalt kettles being shown in the upper one



ORD ROAD SURFACER

THE ORD SURFACER

The Ord Concrete Road Surfacer has as its main members 7-inch steel channels braced with heavy gusset plates, this frame carrying a gas engine and all machinery and being in turn carried at each end by steel trucks running on the side forms. The truck wheels are 12 inches diameter with flanges 1 inch deep. The engine is a 5-h. p. "New Way" gasoline engine, speed 400 to 900 r.p.m. The traveling speed of the machine is 5 feet per minute forward and 24 feet backward.

The machine is equipped with two strike-off beams that are worked backward and forward in opposite directions across the road, thus balancing their reactions on the main frame. The length of stroke can be regulated from nothing to 10 inches, according to the concrete mix. Each strike-off beam is built up of an 8-inch I-beam, standing vertically, and an 8-inch channel, lying flat on the surface of the road, the latter being bent to a true arc of a circle with the established crown of the road, the bending being done by means of adjusting screws.

The gears have machine-cut teeth, all shafting is extra heavy, the friction clutches are of generous size, and in all respects the machine is said to be substantially built. The weight of a machine for an 18-foot road is about 5,000 lbs., of which about 1,200 lbs. is in the front beam and 1,000 lbs. in the rear beam, most of which weight is floating on the concrete during operation and is not carried by the side forms. This surfacer is manufactured by A. W. French & Co.

NEW IROQUOIS RAPID MIXER

A small plant for making hot asphalt mix for repairs has just been placed on the market by the Barber Asphalt Company. To make a mixture in this, place sand and filler in the skip of the Iroquois Rapid Mixer, dump the mixture and Genasco liquid asphalt into the mixer of the machine while the agitating blades are revolving, add two pints of gasoline, strike a match and in six minutes, when the flame has died out, you will have four cubic feet of sheet asphalt mixture, hot and ready to spread. Asphaltic concrete and asphaltic macadam mixtures can be made in even less time, it is said.

When the lighter portions of the liquid asphalt have burned out, they leave a hot asphaltic mixture having a temperature of between 250 and 350 degrees F. The material, it is claimed, is not coked in heating.

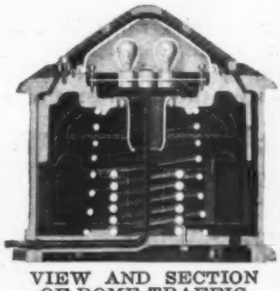
The entire plant can be mounted on a small motor truck chassis. It needs only two men to operate it. The shipping weight is 5,200 lbs. The necessary hand tools are furnished with the mixer. It is believed that a 5-ton tandem roller is desirable for compressing the mixture in the pavement, although satisfactory compression can be obtained by using a 1,000-lb. hand-roller giving a pressure of 50 lbs. per square inch.

PAVEMENT REINFORCEMENT

The Corrugated Bar Company has developed the Corr-Bar Road Unit of reinforcement which consists of two corrugated bars fabricated into a unit by means of chairs spaced at approximately three-foot intervals along the bars. The chairs have a base area of 2 square inches, resting upon the subgrade. These hold the bar reinforcement at the exact position desired relative to the upper and lower surfaces of the concrete pavement. The chairs are made to hold the bars at any desired vertical distance apart to meet the specifications. Calculation shows that a vertical displacement of ½ inch to 1 inch of a reinforcing bar means a loss in efficiency of 15 to

USING CORR-BAR ROAD UNIT REINFORCEMENT

tance apart horizontally is determined on the ground by the spacing of these units. The units can be assembled into large mats which can be carried from the place of assembly to its position in the road. The units may also be used in conjunction with triangle or other mesh, which can be fastened to the units. A template for assembly of road units into mats with any desired spacing is furnished by the manufacturers.



VIEW AND SECTION OF DOME TRAFFIC LIGHT

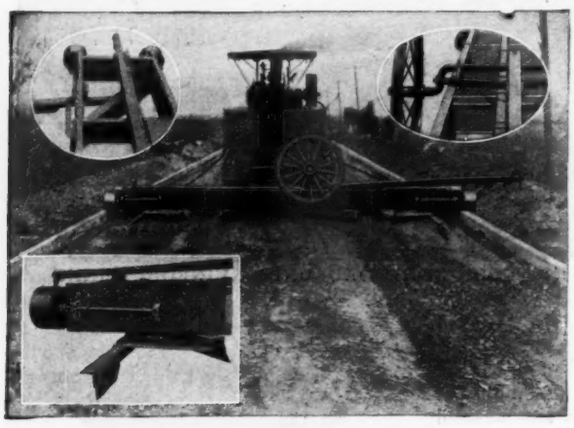
DOME SAFETY TRAFFIC LIGHTS

The Safety Traffic Light Manufacturing Company furnishes a traffic control device which it believes offers less danger to traffic than any other. Its outstanding feature is the dome or head which is held above the pavement by a powerful coiled spring, but which, should an automobile roll on to it, lowers into a pot which is set below the pavement surface, the dome rising again when the wheel has passed over it. Owing to the construction, it is said that all water falling on the dome runs off and does not enter the pot or collect around the lights. The lamps are suppported by eight light coil springs which so reduce any shock as to give the lamps a long life. The lamps used are 50-watt mazdas. The globe is made of ¼-inch ruby or green glass. The outside diameter of the road flange is 22¾ inches and the dome rises 8 inches above the roadway, lowering to 2½ inches when depressed.

IROQUOIS RAPID MIXER

HUG SUBGRADING MACHINE

A sub-grading machine has been put on the market by the Hug Company which is claimed to replace ten men and trim the sub-grade true to the exact grade and crown specified. It leaves the surplus earth in windrows for filling up low spots. It is ordinarily drawn by a road roller or tractor, and rides on the side forms or rails.



THE HUG SUBGRADING MACHINE

is fitted with a top of No. 16 gauge steel plate.

The running gear is of steel, the front wheel of 30-inch and the rear wheels 56-inch diameter. The front axle, of 2¼-inch square steel, carries a fifth wheel gear, platform, stiff tongue, singletrees and evener. It is fitted with a 17-gallon oil tank, pump and Macleod oil burners ready for operation. The net weight is 3,000 lbs. The illustration shows an outfit supplied to the City of Montreal.

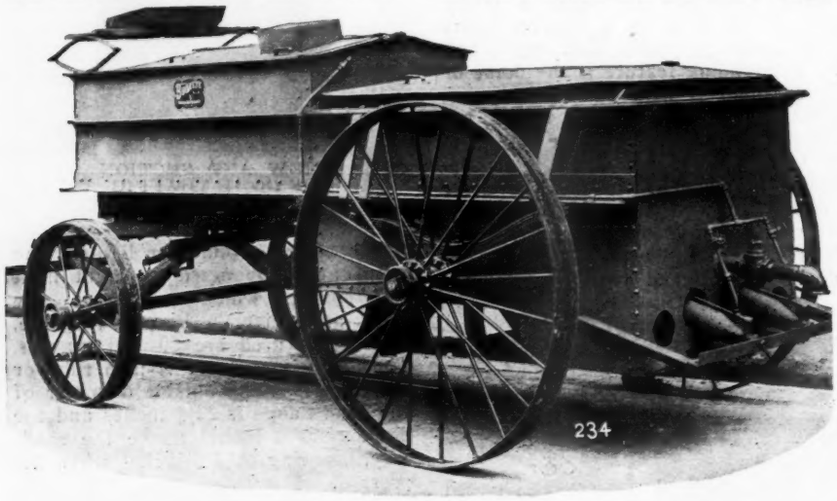
THE BEAR TRACTOR

The manufacturers, the Bear Tractor, Inc., claim that it delivers 80% of the engine horsepower at the drawbar. It is of the crawler type, turns in a 6-foot radius, has 95% of its weight practically spring mounted, has 3-point suspension frame allowing 16-inch oscillation of the front wheels and has a net weight of 5,500 pounds and is sold to deliver a minimum of 25 h. p. at the drawbar, but has a reserve of 100%. It is 118 inches long over all, 60 inches wide and 54 inches high. By a system of compensating track rollers the track is made to hug the ground, no matter how rough, the springs which support the tractor forcing the track rollers into contact with the track rails.

For lubrication, the Bear has all rotating parts packed in liquid oil, no grease being used, and oiling only once a month is recommended. There are no plain bearings, but annular ball bearings are used throughout.

THE VIALOG

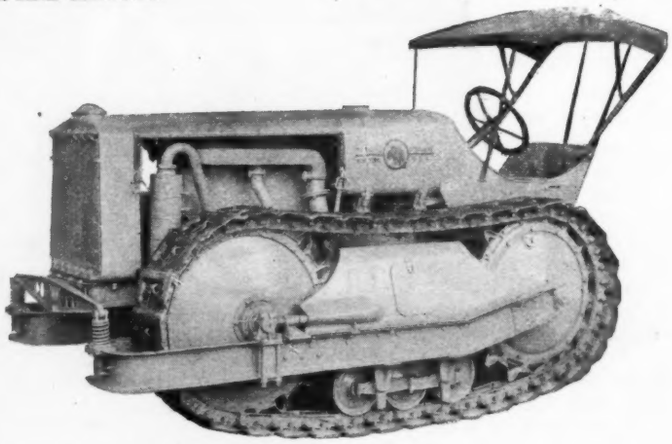
The Vialog is a recording instrument designed for the use of highway engineers and recently placed on the market. A paper chart 6 inches wide is caused to move by a flexible shaft connection to one of the front wheels, while two pencils actuated by connection with the front axle make records upon it. The apparatus is placed inside a box fastened in the front of an automobile. As the automobile is driven over a road the paper chart moves at a rate in direct ratio to the distance travelled (one inch to fifty feet of road) and the recording pencils make a series of irregular or straight lines depending upon the condition of the pavement, any depressions and high spots passed over being located, measured and recorded. The chart is in plain view of the driver at all times so that notes and topography may be sketched in at the time. Incidentally the length of the road is measured and culverts, ditches, property lines, etc., may be located and a comprehensive survey made. Irregularities in the pavement are automatically summed up so that the observer at any time may read the sum of the irregularities passed over by the car up to any given instant, which may be reduced to inches of irregularities per mile of pavement. The mechanism is



MacLEOD COMBINATION DRYER AND HEATER

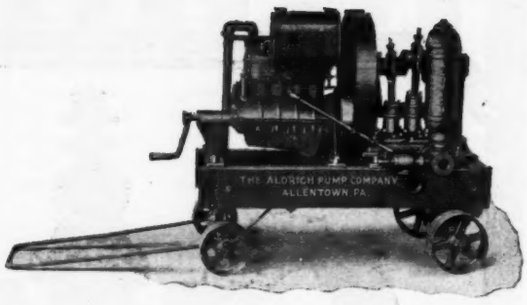
COMBINATION GRAVEL DRYER AND TAR HEATER

The Macleod Company has recently put upon the market a combination gravel dryer and tar heater for use with fuel oil only. The tar kettle has a capacity of 100 gallons and is made with a semi-circular bottom of 3/16-inch boiler plate and fitted at the rear with a 2-inch faucet. The gravel heater has a capacity of 13 cubic feet and is also constructed of 3/16-inch steel boiler plate. Several batches of sand per hour can be heated. The front part of the outfit has a space 6 feet long and 36 inches wide which can be used for carrying tools or other materials. The gravel and tar heaters are surrounded by a combustion chamber so that all the heat is utilized. It



THE BEAR TRACTOR

VIALOG ATTACHED TO DASHBOARD



ALDRICH CONTRACTORS' PUMP

built almost entirely of aluminum. The paper is furnished in lengths sufficient for inspecting eleven miles of road. A clutch is provided so that the instrument can be operated or disengaged at will.

The inventor is Harley Dunbar, an engineer in the employ of the New York State Highway Commission. The appliance is manufactured and sold by the Universal Road Machinery Company of Kingston, New York.

HIGHLAND BODIES

The Highland Body Manufacturing Company provides a closed cab with sliding doors that it believes meets all cab requirements of the users of trucks. It can be closed up for winter service with the least possible obstruction to vision, and can be opened wide with no door pillars to obstruct vision or access. All moving parts are under heavy spring control which it is said makes the cab noiseless, although windows and doors work freely. Cushions and backs of seats are of spring bellows construction.. The cab is built in two sizes, 54 inches and 60 inches wide.

ALDRICH CONTRACTOR'S PUMP

A contractor's pumping unit is manufactured by the Aldrich Pump Company which consists of a triplex pump with outside packed plunger operating through extra-deep stuffing boxes. Renewable bronze throat rings provide against wear on the working barrel and preventing sticking of plungers. This pump is especially suitable for road-building requirements with long pipe lines. These units are built in capacities up to 4,500 gallons per hour and for pressures up to 300 lbs.

A HIGHLAND BODY

INDUSTRIAL NOTES

STANDARD CONVEYOR CO. BUYS "BROWN PORTABLE" LINE

The Standard Conveyor Company announces that it has acquired by purchase all the rights, titles and patents pertaining to the "Brown Portable" line of portable and sectional piling, elevating, conveying, loading and unloading machinery for the handling of packed and loose materials.

This line of machinery has been manufactured by the Brown Portable Conveying Machinery Company at North Chicago for ten years. Until further notice, the plant will be continued in operation by the Standard Conveyor Company, and all inquiries and correspondence regarding "Brown Portable" products should be addressed to the "Brown Portable" Products Plant, North Chicago, Illinois.

The organization of the acquired company will continue with the Standard Conveyor Company.

INGERSOLL-RAND BUFFALO OFFICE

The Ingersoll-Rand Company and The A. S. Cameron Steam Pump Works announce the opening of a branch office at 718 Ellicott Square Building, Buffalo, N. Y. This new office is equipped to render full service to those interested in air, gas and ammonia compressors, vacuum pumps, turbo blowers and compressors, condensers, oil and gas engines, pneumatic tools, rock drills, centrifugal and direct-acting pumps and other of the numerous products manufactured by these companies.

AMERICAN-LAFRANCE COMPANY CHANGES

During December changes were made in the selling force of the American-LaFrance Fire Engine Company, A. M. Donaher, formerly in charge of sales for Ohio, being made manager of sales for California with headquarters at San Francisco; Howard M. Karr, formerly salesman for the Sundry Sales Department of Western New York, being made branch manager at San Francisco, and R. C. Engels, formerly sundry branch sales manager at New York, taking Mr. Donaher's territory, and Mr. Engels being succeeded by J. J. Egan. In Boston, Harry Lovell is transferred from the sundry sales to the apparatus sales staff, and A. H. Kohnen from the Chicago branch takes his place. Robert Henrich was transferred from Boston to Elmira.

DISTRICT MANAGER OF HOLT MANUFACTURING COMPANY

The Holt Manufacturing Company announces the appointment of W. D. Crawford as district manager of its Omaha branch covering the states of Iowa and Nebraska and the southern part of South Dakota. The address of the Omaha office is changed from 2429 Farnam Street to 703-712 Tenth Street. Mr. Crawford was previously in charge of the comppany's Des Moines branch. With the realignment of the territory, additional salesmen have been added to the organization of this district.

INDEPENDENT CONCRETE PIPE CO.

J. A. Dunn, formerly assistant secretary of the American Concrete Pipe Association and before that field engineer for the Portland Cement Association, and an associate member of the American Society of Civil Engineers, has been added to the organization of the Independent Concrete Pipe Company.

METAL LATH AND GYPSUM PLASTER

The Underwriters' Laboratories of the National Board of Fire Underwriters have just issued a report on

(*Continued on page 30*)

CLARK
METER COUPLING YOKE

Meter Box Coupling Yoke

As a matter of economy, we recommend the elimination of the cross connecting pipe shown in the illustration of basement installation, and by simply substituting a top outlet fitting for the regular fitting used on the Meter Box type, this same coupling yoke becomes fitted for basement installation, connections being made as shown by illustration on the right.

THE Clark Meter Coupling Yoke is very flexible—adapted to use in the meter box as well as in the basement installation. Readily adapted to basement conditions of installation by the substitution of a few parts.

Will withstand 300 lb. water pressure. Fits any meter—no unions required under any condition—readily sealable—holds supply pipes rigid—large water ways prevent loss of head by friction. No meter should be placed either in a meter box or in the basement without a Clark Meter Coupling Yoke. All parts of basement and meter box yokes are interchangeable, thus reducing your necessary warehouse stock to a minimum. Furnished with Test Cocks for determining whether meter is operative. Also furnished with wheel handled compression controlling valves on either one side or both sides of the meter—these valves substituting the regular cast iron ells. This type of valve obviates the need of service cock and service box.

Basement Coupling Yoke

The only difference between this and the meter box type yoke (should you not use the cross connecting pipe) is in one slide block ell with top outlet; all same price. Can be placed in any position relative to location of pipe and will always fit. No unions *ever* required.

TEKSAGON

Read Backward

METER COUPLING

This coupling is now used exclusively with great success by many water departments. It has been thoroughly tested and tried out and is not an experiment. No gasket is used nor required to make a joint. By the elimination of the gasket, choked water ways are prevented, thus insuring the full capacity of pipes and meter. Eliminates leaks caused by worn-out gaskets. Use the "Teksagon" and avoid all trouble and expense caused by gaskets. Workmanship and material the best. Price is as low as the ordinary coupling. Fully guaranteed.

WRITE FOR BULLETINS

H. W. CLARK COMPANY

EVERYTHING FOR THE WATER WORKS AND MUNICIPALITY

1308 Broadway, MATTOON, ILLINOIS, U.S.A.

New York Salt Lake City Chicago
Memphis San Francisco Buffalo

Clark Meter Boxes—Southern (A)
Clark Meter Boxes—Northern (AA)
Clark Meter Testing Machines—Six Models—Bulletin B.
Clark Testing Instruments Increase Earnings—Bulletin C.
The New C. M. B. Service Box Corrects All Service Box Faults; Valve Boxes, Valve Housings, etc.—Bulletin D.
Water Works Pumps of All Kinds—Bulletin E.
Municipal and Miscellaneous Castings—Bulletin F.
Venturi Meters—Check Your Pumpage and Waste—Bulletin G.
CAST IRON PIPE, FIRE HYDRANTS and VALVES, AIR VALVES, BRASS GOODS, etc.—Bulletin H.

(*Continued from page 21*)

elected vice-president, while in the Public Works Division A. S. Downey was elected chairman and Frank Stuart vice-chairman.

In a general session on Thursday morning the Committee on Contracts reported that progress had been made in drafting a form of contract including clauses releasing retained percentages and there was good prospect of incorporating in Government contracts a clause providing for arbitration before a board of review.

In the matter of finances, it was stated that it had been definitely decided that no more bonds of the association would be sold in order to cover its expenditures that exceeded its annual receipts and that money would not be borrowed again under any circumstances, there being a very general and strong sentiment against spending in any year more than the actual receipts of that year, and it was decided to limit the expenditures of 1923 to $125,000 or less if necessary to keep within the income. It was voted that for the present system of dues there should be substituted payment according to classification, chapter members paying $30 per year, co-operative members $250 and sustaining members $500 and providing that each chapter shall have at least one co-operating membership for each ten members. It is proposed to withdraw the field secretaries and President-Elect Cowper appointed James S. Ellison as chairman of a Membership Committee.

On Friday morning the Committee on Transportation and Committee on Contracts presented their annual reports, following which Henry S. McKee delivered an address on "Construction From the Banker's Viewpoint," explaining the essentials that go to make up credit, including character, business record, assets, well-kept books, steady patronage of the borrower's bank, and assured revenue during the life of the loan that will enable the borrower to repay.

The report of the Committee on Insurance and Bonds was presented by D. A. Garber and that of the Committee on Materials by W. A. Rogers, following which were the reports of the Committee on Codes and of the chairmen of the four divisions.

In the afternoon George W. Allen read a paper on "Contractors' Suretyship Relations," in which he made a plea for the presentation of a proper statement of assets and liabilities to surety companies who go on contractor's bonds.

A number of resolutions presented by the Resolutions Committee were adopted with little discussion, but a resolution on the war fraud indictments offered by F. L. Cranford gave rise to quite animated discussion, some preferring the milder resolution of the committee, but Mr. Cranford's motion was finally carried almost unanimously. This resolution was as follows:

"Whereas, when war was declared in 1917 the unpreparedness of this country developed the necessity of constructing as a precedent to the training of our army and the manufacturing of munitions; and,

"Whereas, it is a fact that the fate of the world was in balance, depending upon the speed with which this country could develop its facilities in men and munitions; and,

"Whereas, as a consequence thereof it was recognized that the utmost speed in construction must be attained; and

"Whereas, the surest measure of the wisdom of the procedure adopted by the War Department is that it accomplished the result, and the consideration at this time of other plans can only be conjecture; and,

"Whereas, the Department of Justice of the U. S. Government has secured indictments for conspiracy against seven former war officials in connection with construction and has sued 11 general contractors who built 11 of the original cantonments and,

"Whereas, the bringing of these eleven suits and securing the indictments of the seven former government officials calls for a defence of the construction industry before the bar of public opinion by this body and a request for a suspension of judgment by the public until after the trial of these cases;

"Therefore be it resolved, that we agree with and reaffirm the approval of the form of contract and procedure of war construction contracts made by the committee of technical experts headed respectively by A. N. Talbot, then president of the American Society of Civil Engineers, and by Francis Blossom, of the firm of Sanderson and Porter, quoting from the latter as follows: 'The board finds that the use of this form of contract as finally developed was well justified and contributed to the success of the emergency program; that by its use speed was obtained in war construction projects; and that it is probable that such work could not have been performed in the time available without it or its equivalent;

"Be it further resolved that no act of an individual, no overzealous public official, no propaganda, can dim the pride and honor we have in the men who planned and built the work needed to win the war, and when again our safety and civilization are in danger we will honor and applaud men with the skill, ability and courage to get results in spite of rules, regulations and red tape;

"Be is further resolved that the Associated General Contractors of America in convention assembled in Los Angeles, Calif., demand the immediate trial of all these proceedings; that we look with suspicion at any delay; and that every member of our industry throughout the land should insist and demand through every avenue of influence that may be available to him that the Department of Justice be challenged to prove the charges it has made."

Previous to Mr. Cranford's resolution, the officers for 1923 were introduced and the new president addressed the society, stating that probably building work would be restricted by rising costs and expressing the desirability of modifying the immigration laws. He also spoke in favor of the American Construction Council.

KENTUCKY ASSOCIATION OF HIGHWAY CONTRACTORS

The nominating committee of this society has made the following recommendations for names to be placed on the official ballot to be voted on at the annual convention on Feb. 20th: For president, George B. Carey and Rodman Wiley; for vice-president, H. DeB. Forbes and J. H. Cahill; for second vice-president, J. S. Walton and W. N. Bosler.

ROAD BUILDERS ASSOCIATION

The annual convention of the American Road Builders Association in Chicago in January had the largest attendance probably of any in the history of the Association, over 500 delegates having been present. About thirty papers were presented and, although there was very little discussion of them, they occupied six sessions. A number of them were of unusual excellence and while our space does not permit any extended publication of them, we hope to present abstracts of the more important ones in PUBLIC WORKS.

While the attendance of contractors and, to a somewhat less extent, of engineers was drawn more from the territory within a few hundred miles of Chicago, prominent road engineers were present from all sections of the country as well as an appreciable number of contractors and others interested in the subject.

One session was devoted to general policies, another to theory and designing of pavements, a third to construction, one to maintenance, etc. Contractors were especially interested in the description of equipment used for handling materials such as industrial railways and trucks of various types. Maintenance was considered from the point of view of state organizations, that by North Carolina being described by Frank Page, that by Wisconsin by J. T. Donaghey, "Maintenance of Gravel Roads" by L. H .Nielsen and "Maintenance of Earth Roads" by W. H. Root.

Progressive construction as practiced in Iowa was described by C. C. Coykendall and that of North Carolina by C. M. Upham. W. A. VanDuzer and Alex W. Muir described methods of handling macadam roads in Pennsylvania and New Jersey, respectively. The results of the Bates test road were discussed by Clifford Older, those of the Pittsburg Road by Lloyd Aldrich, and the Arlington tests of the Bureau of Public Roads by A. T. Goldbeck.

Some of the other subjects discussed were: "Keeping the Public Sold on the Highways," "Delays in Highway Building," "Road Work in Winter," "Tourist Traffic and Highway Development" and "Motor Vehicle Legislation."

The exhibit occupied nearly 80,000 square feet of floor space in the Coliseum and adjoining buildings, in which displays of products were made by 217 manufacturers. Even this space was much smaller than could have

(*Continued on page 30*)

(*Continued from page 28*)

been used to advantage, and the Highway Industries Exhibitors Association has appointed a committee of seven to consider the building of a permanent structure sufficiently large to accommodate future road shows, presumably in cooperation with some other national organizations and on the assumption that future exhibits will be held in Chicago. While the exhibit showed many machines and appliances that had become standard in use, the tendency of the new developments as illustrated by the exhibit is well indicated by the description of new contractors' equipment given in the January issue of PUBLIC WORKS and in the "New Applance" columns of this issue.

The Highway Industries Exhibitors Association held its annual meeting on January 17th, during the Good Roads Show, and elected for the coming year the following officers: President, S. F. Beatty of the Austin-Western Road Machinery Company; vice-president, John B. Hittell of the Asphalt Association; treasurer, C. N. Leet of the Milwaukee Locomotive Company; and secretary, H. R. Snow of the Autocar Company. The directors consist of these officers and H. B. Baker of the Holt Manufacturing Company, C. R. Dodge of the Northwest Engineering Company, Frank Dunn of the Dunn Wire Cut Lug Brick Company, C. R. Ege of the Portland Cement Association, H. S. Greene of the Barber-Greene Company, F. G. Hudson of "Engineering News-Record", C. F. Messinger of the Chain Belt Company and K. J. Talbot of the Koehring Company.

BOOK REVIEW

"Depreciation of Public Utilities," by Henry Earle Riggs. This book of 208 pages "represents an effort to set forth the writer's views and conclusions as they have developed in connection with a practice of over twenty years and to present the various arguments which have been considered by him in reaching these conclusions. . . . The attempt is here made to trace briefly the history of regulation of utilities, to present, as the writer sees it, the true conception of depreciation as that word has been used in valuation and regulation practice, and to point out certain important conclusions of the courts which everyone engaged in valuation work ought to be familiar with."

The author is professor of civil engineering in the University of Michigan and has served as engineer for both corporations and municipalities in public utilities valuation cases. The chapters treat of the problems of regulation, investment in public utility properties, the interest of the ratepayer in the property, operating expenses, war period price fluctuations, fair value and the rate of return, fluctuating prices and accounting allowances for replacement, supreme court decisions bearing on depreciation, divergent views as to the propriety of accounting reserves, the uncertain character of depreciation estimates, loss of value which should be deducted, obsolescence, and an appendix analyzing the decisions of the supreme court and the U. S. Courts on depreciation. Published by McGraw-Hill Book Co. 211 pp.

PAMPHLETS

"Portland Cement Concrete Roads"—Bulletin No. 1077 of the U. S. Department of Agriculture. This bulletin was prepared by James T. Voshell, district engineer, and R. E. Toms, senior highway engineer of the Bureau of Public Roads, "to supply reliable information on the subject of concrete pavements for the use of highway engineers and others interested in the improvement of public roads." It describes the materials used, proportioning, designing of pavements, construction, organization and equipment, capital required, cost, maintenance, and resurfacing old pavements. In an appendix are given tables of quantities of materials required, for determining size of pump for delivering water through two-inch water pipe, and the cost of federal aid concrete pavements in the several states. The pamphlet contains 67 pages and is well illustrated with photographs and line drawings.

"What Every Citizen Should Know."—A book of 76 pages giving, in the form of questions and answers, information concerning the federal constitution and laws and also the municipal and state laws of New York. The material was originally prepared for use in classes of foreigners seeking naturalization, but is admirably fitted for use in seventh or eighth grade of schools or as an adjunct to high school history and civics courses. The author is George H. Dunham, who for many years has been helping to prepare immigrants to this country for citizenship. Published by Ginn & Company. Price 72c.

"Cements, Limes and Plasters; Their Materials, Manufacture and Properties," by Edwin C. Eckel. 654 pages, 156 illustrations. Published by John Wiley & Sons. This is the second edition, the first having been published in 1905. The original matter has been extensively revised, and about 100 pages of entirely new matter added, while the space alloted to natural cement has been reduced. The work is divided into seven parts, dealing respectively with plasters, limes, magnesia and oxychloride cements, hydraulic limes, selenitic limes and grappier cements, natural cements, Portland cement and Puzzalan cements. As is appropriate for a book for engineers under present conditions, about one-half of the pages are devoted to Portland cement. In each case the author discusses the materials from which the plaster or cement is made, the composition and property of the product in its commercial form, the methods of manufacture, and considerations of the use of the material, specifications, etc.

INDUSTRIAL NOTES

(*Continued from page 26*)

"Interior building construction consisting of metal lath and gypsum plaster on wood supports," describing in detail the investigation of the safety of this construction. Describes conditions under which the most fire-resistant results may be obtained by the use of these materials. This pamphlet of 120 pages is published jointly by the Underwriters' Laboratories and the Joint Committee of the Associated Metal Lath Manufacturers, National Lumber Manufacturers Association.

WATER WASTE COIN

A novel coin pocket piece is being furnished by the H. W. Clark Company, manufacturers of meter boxes and other water works equipment. It consists of a brass coin pierced with three holes, having diameters of 1/32-inch, 1/16-inch and ⅛-inch respectively which, the company says, "will aid the water works manager in suppressing waste; in metered service it will assist in convincing the consumer as to the correctness of registration of meter where known leaks exist." These holes are such as to pass, in 24 hours at 40 pounds pressure, 180 gallons, 960 gallons and 3600 gallons, respectively.

One of these coins will be sent gratis to any water works superintendent or official on request.

FOUR-WHEEL DRIVE AUTO COMPANY

This company announces that C. J. Cassese, formerly assistant sales manager and acting general manager of that company, has recently been made general sales manager.

NEWS OF THE SOCIETIES

CALENDAR

Mar. 21—BOSTON SOCIETY OF CIVIL ENGINEERS. Seventy-fifth annual meeting, Boston City Club. Secretary, J. B. Babcock, Tremont Temple, Boston.

Mar. 21-22—ILLINOIS SECTION, AMERICAN WATER WORKS ASSOCIATION. Fifteenth annual meeting, Decatur, Ill. Secretary, G. C. Habermeyer, Urbana, Ill.

May 7-9—AMERICAN ASSOCIATION OF ENGINEERS. Ninth annual convention, Norfolk, Va. Secretary, C. B. Drayer, Chicago.

May 21-25 — AMERICAN WATER WORKS ASSOCIATION. Annual convention, Statler Hotel, Detroit, Mich. Secretary, John M. Diven, 152 West 71st Street, New York City.

June 15—TEXAS WATER WORKS ASSOCIATION. Joint Convention with Southwest Water Works Association, Wichita Falls, Texas. Secretary, V. M. Ehlers, Austin, Texas.

Oct. 8-13—AMERICAN PUBLIC HEALTH ASSOCIATION. Fifty-second annual meeting, Boston, Mass. Secretary, A. W. Hedrich, New York City.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Memphis, Tenn. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov.—OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

NEW ENGLAND WATER WORKS ASSOCIATION

This association held a meeting on February 13th at which were read a paper by Philip W. Ayres entitled, "The Reforestation of Water Sheds," and one by George F. Merrill on "The Application of a Booster Pump to the Gravity System of a Water Supply," reference being made to Greenfield, Mass., where the author is superintendent of water works. Six new members were elected at the meeting, which was preceded by a meeting of the executive committee and a luncheon.

Previous to the reading of these papers a half-hour discussion was held on the subject, "What Rates Should be Charged to Water Consumers Owning More than One House Upon a Lot or Parcel of Land and Who are Supplied with Water Taken Through a Single Meter?"

Mr. Ayres, who is a member of the Society for the Protection of New Hampshire Forests, gave some figures from different cities showing the extent of reforestation on water sheds of municipal water systems. One city reported planting 20,000 trees a year, another 15,000, etc. The record showed over 7,000 acres planted in six New England states. However, there are over 6,000,000 acres of idle land in New England, which might well be reforested, and should be to meet the rapid destruction of New England's forests.

Mr. Merrill in his paper described the service rendered by a booster pump and the advantages that had resulted. Incidentally he showed, among other slides, one of a Ford truck equipped as a service truck, adapted to winter work by substituting runners for the two front wheels, and the placing of a caterpillar tread on the rear ones, which had facilitated traveling through snow.

CHEMICAL AND BACTERIOLOGICAL SECTION, A. W. W. A.

The secretary of this section, Jack J. Hinman, Jr., has announced that the present plan for the meeting of the section at the American Water Works Association convention May 21st to 25th is to divide the meeting into three parts for discussing three general phases of work, these being: (1) Elements of filter plant construction from the water works operator's point of view; (2) the theory of corrosion in the light of recent development in colloidal chemistry; (3) the mineral content of municipal supplies. The purpose of the last is to consider particularly the physiological effect of the mineral content of drinking water.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS

This association has opened general offices in the Munsey Building, Washington, D. C., with W. C. Markham in charge with the title of "executive secretary."

AMERICAN ENGINEERING COUNCIL.

The Executive Board of the American Engineering Council will meet March 23d and 24th at 9:30 a. m. in Cincinnati at the Ohio Mechanics' Institute. President Cooley states that at least a dozen engineering societies are about ready to join the federation. At its recent meeting in New York the Committee on Procedure voted to submit to the American Society of Mechanical Engineers the question of undertaking an intensive study of labor-saving devices.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

Subjects of interest to public works engineers are to be considered at several of the meetings of the local sections of the A. S. M. E. during March. On March 19th the Minneapolis section will hold a joint meeting with the Minneapolis Engineers' Club to discuss the subject of "The New Spirit in Management." On March 22nd the Chicago section will listen to an address by W. P. Horsford on "The Development of Engineering Equipment." On March 27th the Atlanta section will meet at the Town Hall Chamber of Commerce, where Earl F. Scott will address the section on "Operation and Cost Comparison of the Isolated Power Plant vs. the Centralized Electric Station at the Present Rates for Electric Power for Plants Up to 500 KW. Capacity."

BROOKLYN ENGINEERS' CLUB.

The March meeting of this club was addressed by Clarence D. Pollock on the subject of "City Planning an Engineering Problem," in which he outlined what planning should embrace and how it can be established and enforced, and its co-ordination of the work of the various established departments and municipal boards for the orderly growth and expansion of industry, housing and transportation of a municipality.

He stated that modern city planning should embrace street systems, traffic regulation, parking of vehicles, bridges, grade crossings, provision for water and other public utilities, sewerage, paving, waste disposal, play grounds, water fronts, building lines, housing, billboard regulation, zoning—all the factors in the life of a city. The greater part of the paper was devoted to a discussion of zoning.

PERSONALS

Howell, William A., engineer of Bureau of Streets of Newark, N. J., died of apoplexy on March 12. He was born in Newark sixty-four years ago. He was a past president of the American Society for Municipal Improvements, and for years prominent in the paving investigations by that body. He had been engineer in Newark's employ for thirty years.

Stillwell, Harry L., mechanical engineer for the city of Atlanta, Georgia, has resigned and will be located in New York City.

Caldwell, Walter G., for three years past highway engineer of the Waukesha County Commission, has resigned and on January 1 began private practice at Waukesha.

O'Keefe, E., will represent the Western Paving Brick Manufacturers' Association in Iowa and Minnesota, with Mason City, Iowa, as headquarters.

Connell, William H., has been appointed Assistant State Highway Commissioner of Pennsylvania. He will temporarily occupy the position of Chief Engineer until March 1, and thereafter act as engineering executive of the department.

Biles, Geo. H., on January 30, resigned as Assistant State Highway Commissioner of Pennsylvania, to become effective March 1. He has been connected with the department since June, 1905, when he enterd as chief draughtsman.

Bond, Philip, has been appointed city engineer of Holyoke, Massachusetts. The business of the firm of Franz & Bond, of which he is a member, will be continued by Fred H. Franz.

Houk, I. E., city engineer of Dayton, Ohio, has been elected president of the Dayton Chapter of the American Society of Civil Engineers.

Miller, H. B., formerly with the U. S. Shipping Board, has been appointed assistant city engineer of Chicago.

Christlaf, A. E., formerly highway engineer of Baltimore, Md., has been appointed chief engineer of that city.

Goob, Charles F., has been appointed highway engineer of Baltimore, Md., succeeding A. E. Christlaf.

Greene, Col. Frederick Stuart, has been appointed commissioner of highways of New York State by Gov. Smith. Col. Greene held the same position during Governor Smith's previous administration.

Kingsley, Edgar A., has joined the organization of the Benham Engineering Company of Kansas City and will be located in Oklahoma City.

Morrow, B. C., borough engineer of Washington, Pa., has been employed as superintendent of the Citizens' Water Company of that city.

McComber, Capt. F. A., for several years in the Duluth City Engineer's office, has been appointed assistant city engineer of that city.

Paxton, J. W., has resigned as assistant engineer of the Division of Street Cleaning of Philadelphia because of ill health.

Warnock, W. H., has been appointed town engineer of Montclair, N. J., succeeding William F. Bates, who died January 10th.

Sargent, E. H., has been appointed engineer for the Hudson River Regulating District with office at Albany. Mr. Sargent formerly was connected with the State Engineer's Department in charge of the Bureau of Water Power and also engineer for the New York Water Power Commission.

Perring, H. G., has been appointed supervising engineer of the Public Improvement Commission of Baltimore. Mr. Perring formerly acted as chief engineer of Baltimore.

Rights, Eugene J., has been appointed professor of civil engineering at the University of Porto Rico, Mayaguey, P. R. Mr. Rights has for the past fourteen years been connected with the firm of Lewis F. Shoemaker & Company and the Shoemaker Bridge Company in the capacity of erection engineer, handling such difficult jobs as the wet dock crane for the American International Shipbuilding Corporation at Hog Island, Philadelphia.

Moodey, Theodore B., has been elected county highway and bridge engineer for Weld County, Colorado, succeeding John Wortham, who resigned. Mr. Moodey was formerly civil engineer with headquarters at Greeley, Colorado.

Lile, Robert, has been appointed street superintendent at Livingston, Calif.

Scott, D. G., succeeds Capt. Henry D. Ball, deceased, as county superintendent of highways, Jefferson County, N. Y.

Brown, George Carleton, has been appointed district engineer in charge of highway maintenance at Ann Arbor, Michigan, succeeding W. W. Shaner, who resigned. Mr. Brown formerly acted as resident engineer for the State Highway Department of Michigan.

Bottorff, H. C., has been appointed city manager of Sacramento, Calif., succeeding Clyde L. Seavey. Mr. Bottorff formerly has acted as city comptroller for Sacramento and as assistant city manager since this form of government was instituted.

Hume, Harry H., since the resignation, two years ago, of Martin C. Polk, acting as road engineer for Butte County, Calif., has been re-elected to the same office for a term of four years.

Fessenden, George, has been selected as county engineer and surveyor of Flathead County, Montana, and Robert Fleming has been selected to the post of county highway engineer of the same county. Their office will be located at Kalispell, Mont.

Finnie, O. S., has been chosen as chairman of the Engineering Institute of Canada, Ottawa Branch. Mr. Finnie has been acting as director of the Northwest Territories and Yukon Branch of the Department of the Interior.

Foster, E. J., has been selected for the office of county engineer for Webb County with office at Laredo, Texas.

Kelly, W. J., has been appointed to the post of county engineer for Montgomery County with office at Conroe, Texas.

White, Alvin L., has been appointed as county engineer for Brewster County with office at Alpine, Tex.

Hamilton, Andrew, has been appointed district manager and consulting engineer for the National Lime Association at Dallas, Texas. Mr. Hamilton has been connected with the engineering firm of Hamilton & Shreve at Fayettville, Ark. Mr. Shreve will continue to conduct the business of the firm.

Pease, Frank R., has requested a release from his office as engineer of the Board of Fire Engineers of New Bedford, Mass., owing to ill health, and the board, acting on this request, have placed before the State Legislature a bill calling for Mr. Pease's retirement after service of thirty years, on half pay.

Adams, Thomas, and L. Thompson have entered partnership as town-planning consultants with offices at 16 East 41st Street, New York, and 121 Victoria Street, Westminster, S. W. 1, London, England. Mr. Adams formerly acted as town-planning adviser to the Canadian Government and Mr. Thompson formerly acted as assistant architect to the housing department, Ministry of Health.

Emerson, C. A., has been appointed Philadelphia representative for Fuller & McClintock of 170 Broadway, New York, who have opened a branch office in that city, for engineering practice. Mr. Emerson for the past nine years acted as chief engineer of the Pennsylvania State Department of Health.

Duran, Joseph L., has been chosen county superintendent of highways for Stark County with office at Toulon, Ill.

Behrens, Ray E., has been appointed county highway engineer of Waukesha County, Wisconsin.

McFarland, Kirk, has gone into contracting work with M. E. Gillioz at Monett, Missouri. Mr. McFarland formerly acted as engineer of construction for the Missouri State Highway Commission.

Milliron, M. E., has been appointed city engineer of DuBois, Pa., succeeding Wilson Morrow, resigned. Mr. Milliron was formerly associated with the Carson Engineering & Construction Company of Butler, Pa.

PAMPHLETS

"Compressed Air Illness and Its Engineering Improvements," with a report of cases at the East River tunnels. This pamphlet of 48 pages is published by the Bureau of Mines, having been prepared by Edward Levy, Consulting Physiologist of the Bureau and Consulting Physician to the New York State and New Jersey Interstate Bridge and Tunnel Commissions. He describes the mechanical apparatus used in driving the tunnels with compressed air, and caisson disease caused by work in compressed air; gives instructions for selection of men for this work and discusses hours of labor, pressure, safe working hours, the gases found in tunnels and caissons, and the symptons and treatment of compressed air illness. It also gives the laws of the states of New York and New Jersey containing regulations and safety measures required in those states. Twenty tubes have been built by compressed air in New York, but compressed air methods are not confined to this city but are also used in all parts of the country in foundation work, mine shafts and tunnels.

New Appliances

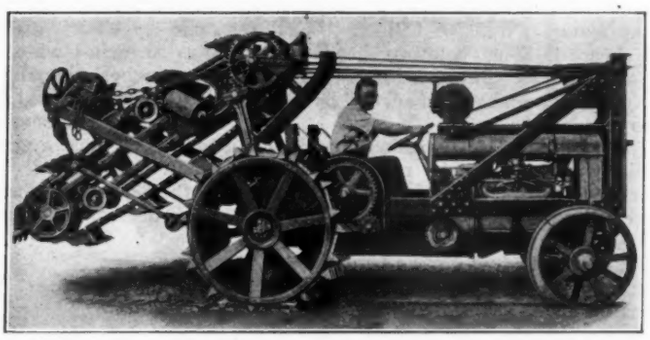
Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

THE PONY-DITCHER

A light-weight ditching machine is manufactured by the Charles T. Topping Machinery Company and called by it the Pony-Ditcher, which is especially applicable for excavating ditches for farm drainage, small sewerage systems, setting curb, etc.

It is not intended to replace a powerful machine of large capacity for deep and wide trenches, but was designed to perform services that heretofore have been done mostly by hand labor. It is low in price and therefore applicable to jobs where more expensive excavators would not be warranted.

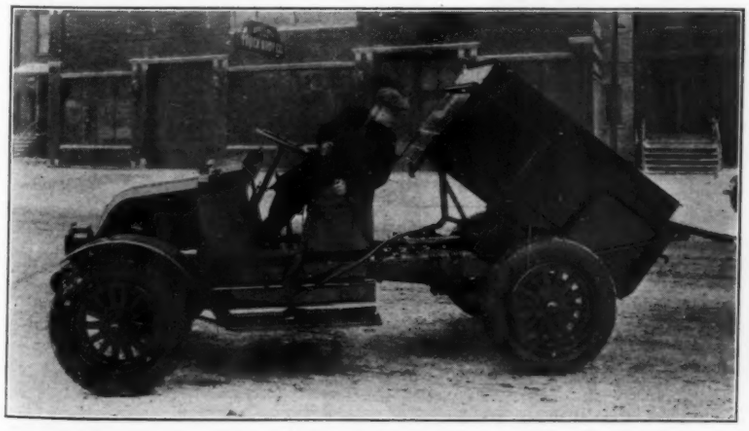
The power plant is a Fordson tractor, furnishing both traction and belt power. The ditcher is so constructed that it permits mounting a complete standard Fordson tractor within its frame without altering the tractor in any way whatsoever, being held in place by cast steel clamps around its rear axle housing (the rear wheels having been removed) and by the pivot pin in its front axle.



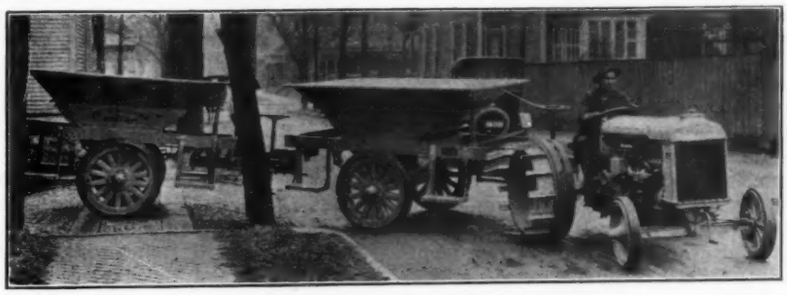
THE PONY DITCHER

The dirt conveyor, which receives the material excavated by the buckets of the excavating boom, discharges either right hand or left, or both sides simultaneously. It can be adjusted to excavate a trench between the wheels or the excavating boom can be off-set to one side. The machine will excavate a ditch 4 feet deep and 12 inches to 22 inches wide at speed of 120 feet to 1,800 feet per hour. The length over all is 16 feet and the width 7 feet 3 inches. It is claimed to dig anything diggable, which includes practically every common material excepting solid rock. In ordinary loam or sandy clay the speed ranges from 225 to 375 lineal feet per hour.

When working, the fuel consumption is approximately 2¾ gallons of kerosene per hour.



INTERNATIONAL CHASSIS WITH "BB" DUMP BODY



MIAMI TRACTORS IN RICHMOND

MOTOR TRUCK DUMP BODY

The International Harvester Company last year introduced a dump body, manufactured by the Central States Engineering and Sales Company, known as the "B.B." body, which is mounted on International Harvester Company's Model 32 chassis. The dump body is of 1½-yard, single-batch capacity, and is operated by one man. The body has positive pivot (does not roll or rock) and is unlocked and dumped by the driver by means of a lever. The load is practically balanced and a pull on the lever unbalances and dumps the load. On dumping the load the tail gate assumes a horizontal position and does not drag the load when the emptied truck moves forward. By pushing on the lever the driver returns the body to position and it and the tail gate lock automatically, ready for another load. A coil spring in tension eliminates shock to the truck when dumping the load.

The chassis is rated at 3,000 pounds capacity, and the rear spring is of the cantilever type, which results in giving unusually easy riding qualities over all roads. It has an extra short wheel base, which permits of turning in narrow space, and the low body and rear end chassis design minimize side sway and so save year on tires.

MIAMI FORDSON TRAILERS

The city of Richmond, Indiana, has purchased eight Miami Fordson trailers and four Fordson tractors after an actual demonstration of the apparatus. Each tractor pulls two trailers through the alleys for collecting ashes and rubbish and then carries them to the public dump. The trailers are provided with large rear doors which are controlled by two levers at the front of the trailer, one to dump the load and the other to rewind the doors. The load can be spread evenly over the ground to any depth by simply adjusting the spreading device or it can be dumped all in one spot as desired. In summer, when the ash

collection is light, these trailers are used for street repair or maintenance work, among other things hauling sand and gravel from the city pit.

For collection purposes the city is divided into four sections with two units in each section. Each unit is accompanied by three men, one driving while the other two collect the ashes. Only the driver accompanies the unit to the dump, while the two collectors accompany the other unit, which has ordinarily returned from the dump by the time the first unit has completed its load. The tractor and trailers travel to the dump at a rate of about 7 miles an hour. Each unit replaces two teams and two men. These trailers are made by the Miami Trailer Co.

BIGNELL PILES

These piles are constructed of reinforced concrete. Each pile has a 4-inch pipe running through the center for the entire length with a 1½-inch outlet at the lower end and on each of the four sides at intervals of about 5 feet ½-inch pipes are connected to this central pipe and extend to the face, where an upward turned ell is placed. Through a 4-inch hose, attached to the upper end of the pipe, water is introduced when the pile is ready for sinking. Under high pressure this is forced downward into the ground from the lower end of the pipe and upward from the branch pipes on the four sides. The large stream jetted downward washes out the soil and allows the pipe to sink of its own weight, while the vertical jets on the four sides furnish lubrication and carry away the sediment. Thus the piles are driven without the use of a hammer and therefore without any possibility of breaking or injury from driving.

These piles were first used for supporting bridge piers on the line of the Burlington Railroad, being driven to rock, which at some points was 50 feet below the surface. Later they were used for riverbank protection, a line of piles being driven from the shore out into the stream and connected by cables, to which in turn trees were attached. These trees served to retard the velocity of the water and bars were quickly formed with the sediment deposited. Later similar work was constructed by Woods Brothers Construction Company at East Omaha, Nebraska, protecting property valued at $50,000,000 or more. More recently the same principle has been applied to concrete sheet piling, which is tongued and grooved and is adapted to seawall and harbor purposes.

OVERLAND CRANE

The Overland Crane is claimed to be the only full revolving one with a differential drive. Differential gears and steering devices enable it to start instantly in any direction regardless of the position of the superstructure. It can hoist, swing and travel simultaneously and all drums can be operated independently of each other. The car frame is built of 12-inch 40-pound I beams. The rotating gear roller path and the center casting are combined in one piece and securely riveted to the frame.

The crane is furnished equipped with traction wheels, railroad wheels or caterpillars, and driven by either steam, gasoline or electric power. It has a lifting capacity of 10,000 pounds at 12-foot radius or 5,000 pounds at 30-foot radius. The maximum single-line pull by either drum is 5,000 pounds. The maximum clearance height is 10 feet 9 inches and maximum width 8 feet 3 inches. The wheel base is 9 feet and outside width of wheel 8 feet 3 inches. Ninety-two per cent. of the material used in the construction is steel. The crane is manufactured by the Overland Crane Company.

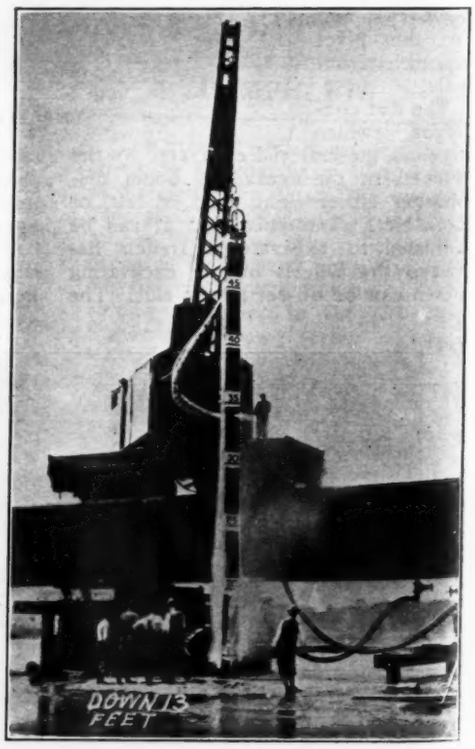
STOUGHTON MOTOR TRUCKS

Motor trucks of 1 ton, 1½ ton, 2 tons and 3 tons capacity are manufactured by the Stoughton Wagon Company, which makes as one of its claims, "Every Wearing Part Oversize.' For the two smaller sizes the motor used is the Waukesha B. U. X., while for the larger sizes, Hercules' motors are used of 25.6 horse power for the 2-2½-ton and 29-horse power for the 3-3½-ton. The rear axle transmission is a Sheldon worm drive. The wheel base of the 1-ton is 130 inches, the 1-1½ and 2-ton is 140½ inches and of the 3-ton, 156½ inches. Any desired type of body is furnished by the Stoughton Body Builders.

FULL-CRAWLER TRACTOR

The Full-Crawler converts the Fordson tractor into a crawler tractor with treads that are claimed not to mar any road but still to develop the maximum pulling power. It has practically the same speed as the Fordson tractor. It is 56 inches wide. The track shoes are 9 inches wide and the area of track on the ground is 1,000 square inches. The weight in service is about 3,600 pounds, giving a ground pressure of about 3½ pounds per square inch. Both treads are controlled by a steering wheel through large brakes on the

BIGNELL FOUNDATION PILES, 50 FEET LONG
The two lowest piles show the 4-in. intakes; the top four the 1½-in. end outlets and the side outlets.



BIGNELL PILE DOWN 13 FEET
Note water spouting from side jets.

BEST TRACTOR ON MERCED IRRIGATION DISTRICT CANAL

drive sprockets, by which it is possible to turn the tractor in a 10-foot circle. The crawler attachment can be assembled on the Fordson within a few hours, without drilling any holes in the Fordson or making up any parts. This tractor is especially recommended for general contracting work, pulling scrapers, ditching machines, etc. It is manufactured by the Full-Crawler Company.

THE "BEST" TRACTOR

The C. L. Best Tractor Company manufactures a track-layer tractor which is finding general use by contractors. Their "Sixty" tractor is well adapted for heavy work, such as the hauling of scarifiers or chisel plows for tearing up clay, hard pan and other material preparatory to the use of a scraper or other earth excavator. The illustration shows one of three "Best Sixties" that are being used in the Merced County Irrigation District of California to haul big five-point chisel plows, which loosen up the bottom of the canal under construction so that mule teams hauling scrapers readily pick up the loosened material. These three keep the material loosened for 120 mules, the plows being at work continuously while the scrapers have to travel to the dump and back.

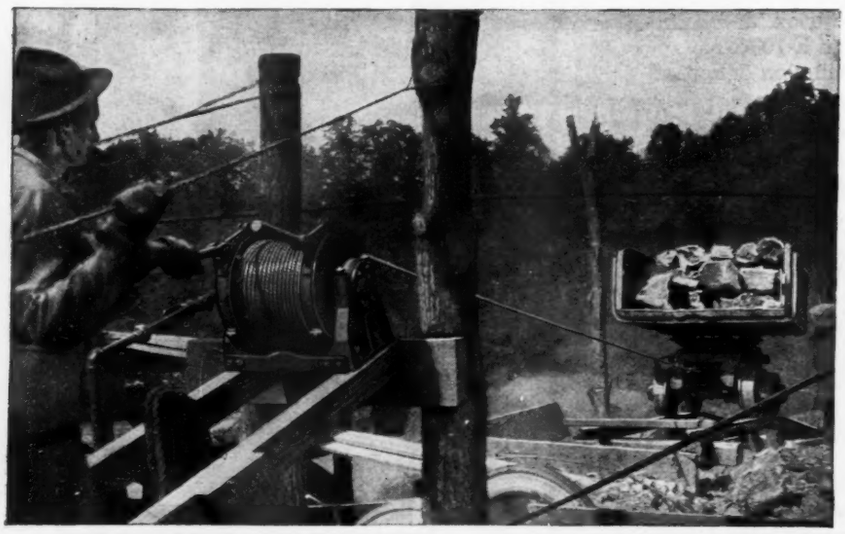
Another instance of recent use was at Wichita Falls, Texas, where five of the same tractors are used to haul elevating graders excavating about 35 miles of canals for a 150,000-acre irrigation project. Still another is at the Berkeley Stadium of the University of California, where two "Sixties" are used for loosening up the cuts for the entrance tunnels, one of these keeping six Baker-Maney scrapers busy moving the yellow clay loosened by the three-point Killefer subsoiler or chisel plow.

AIR HOIST HAULS STONE CAR

In constructing a small hydroelectric lighting plant in Cooksville, Tennessee, last year a quarry was opened for furnishing stone for concrete and the stone hauled in a car up a narrow gauge track about 250 feet to the crusher. This car weighed 1,200 lbs. empty and held three yards of stone. The grade of the track was thirty degrees.

In order to handle the car quickly and cheaply, a small, portable compressed air hoist of the Sullivan Turbinair pattern was installed, bolted on timbers inclined at a suitable angle and fastened to a couple of vertical posts. The hoist weighed only 285 lbs. but developed 6½ h. p., handling the loaded car rapidly and effectively.

This hoist has a rated maximum capacity to lift one ton vertically at the rate of 110 feet per minute. The drum holds 500 feet of 5/16-inch wire rope. The engine consists of a pair of Turbinair rotors or helical gears ground together and running in a tight casing on ball bearings. The ordinary air pressure recommended is 75 lbs. per square inch. Advantage is taken of the expansive qualities of the air and the hoist is said to be very economical in its air consumption. The drum forms the motor casing and revolves with it. The hoist is controlled by a clutch and friction brake. It is manufactured by the Sullivan Machinery Co.



SULLIVAN TURBINAIR HOIST AT COOKSVILLE, TENN.

INDUSTRIAL NOTES

BLAW-KNOX DEVELOPMENT

The Blaw-Knox Company has purchased from the T. A. Gillespie Company nineteen acres of river frontage adjoining the company's present works at Blawnox. The purpose of the purchase is not stated, but it is expected that the company will utilize it for making river shipments and possibly for the construction of new shops. The Blaw-Knox Company in 1911 acquired its first property here, amounting to six acres, which has been added to until the company's holdings now cover practically the entire town of Blawnox.

HALL BROTHERS CEDAR COMPANY

This company announces that it has moved its general office from Jacksonville, Texas, to Coeur d'Alene, Idaho, and will engage in the manufacture and wholesaling of western red cedar posts, poles and piling.

ELECTRO BLEACHING GAS COMPANY

This company announces that S. Willard Jacobs has been appointed manager of sales succeeding D. K. Bartlett, who resigned, the appointment taking effect on January 1st. Mr. Jacobs is a chemical engineer with extensive training in liquid chlorine work, who has supervised the installation of a number of chlorine plants and gained considerable reputation because of his ability in this field. His office will be at 18 East 41st Street, New York City.

DISTRICT ENGINEER FOR EASTERN PAVING BRICK MANUFACTURERS

A. S. Mirick has been appointed district engineer for Western Pennsylvania by the Eastern Paving Brick Manufacturers' Association. His headquarters will be at Pittsburgh, Pa. Mr. Mirick is a Cornell graduate with more than 20 years' engineering experience and has been connected with the New York State Highway Commission and that of the State of Nebraska and has lately been in private practice on municipal and highway construction.

U. S. CASTIRON PIPE AND FOUNDRY COMPANY

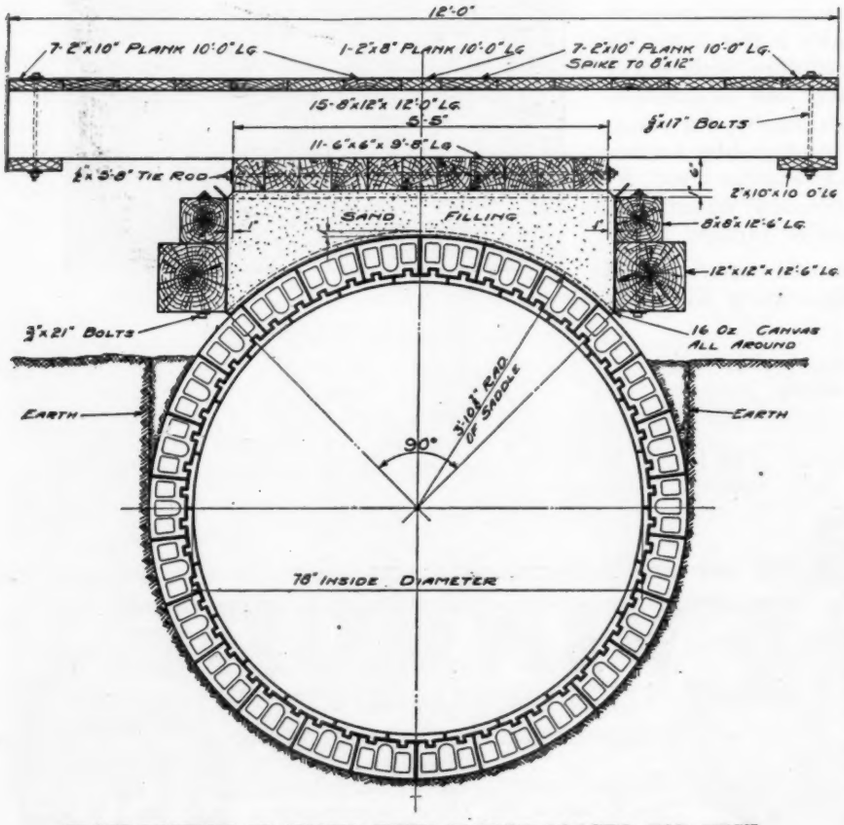
This company announces that the location of its Dallas sales office has been changed from the Scollard Building to Room 617, Magnolia Building. Thomas W. Hanlon will continue in charge.

TEST OF LACLEDE-CHRISTY SEGMENT SEWER

A test was made of a section of sewer constructed of Laclede-Christy segment sewer blocks in October, 1922, by J. L. VanOrnum, professor of civil engineering at Washington University. The sewer was 78 inches in diameter. The section was built at one end of a trench excavated in clay with the bottom rounded to give direct support to the lower half of the sewer up to the springing line; and after the sewer had been constructed, clay was tamped between sewer and trench for about 21 inches higher. The walls were 8 inches thick and the section tested was 10 feet 2½ inches long. On top of this rested a saddle frame or sand box, the sand in which transmitted the load to a 90-degree arc of the extrados; 5,021 pounds of sand were placed in the box, a platform was placed on the sand and pig-iron placed upon it. The sand filling was 9 feet 8¾ inches long and 5 feet 7 inches wide.

The total load began with 1,600 pounds and was increased with increments of about 5,000 pounds up to a maximum load of 198,316 pounds, which gave a load per square foot of 3,652 pounds, and 20,382 pounds per foot of length. The deflection was measured under each load and increased from nothing at 1,600 pounds to 1.87 inches under the maximum load. When 100,584 pounds was in place it was allowed to stand for nineteen hours and during this time the deflection of the crown increased from 0.39 to 0.52 inch. When a 173,035-pound load was reached a 20-hour interval showed an increase in deflection from 1.31 inches to 1.45 inches. The maximum load was allowed to stand for 22 hours, during which time the deflection increased from 1.66 to 1.87 inches.

When the load reached about 25 tons a crack developed at the intrados near the crown and two other cracks at the extrados at an angle of about 55 degrees from the crown of the sewer. As the load was increased from 60 tons to 68 tons the intradosal crack extended entirely through the wall and the other two cracks extended nearly through to the inside surface. Below the surface of the ground three longitudinal tension cracks also developed along the intradosal surface, one about 4½ inches from the invert line and two others at the joints between liners nearest to the lower quarter points, but none of these opened to an appreciable extent. In all cases the cracks started in the mortar joints, and developed first and penetrated faster at the exposed ends of the sewer section. The fact that the sewer section withstood collapse so persistently indicates that it had a large factor of reserve strength.



CROSS-SECTION OF SEWER WITH SADDLE PLACED FOR TEST.

FREEMAN TRUCK TURNTABLE

The Freeman Manufacturing Company has placed on the market a turntable made entirely of riveted steel with no castings, revolving on ball bearings that run in oil so that it is claimed, "a child can turn 10 tons." The turntable, when revolved and supporting the truck, stands high enough to clear the side forms, but the end can be lowered to the ground so as to permit the truck to mount it. It occupies only 6½-feet width of road and empty trucks, a roller or scraper can pass by it. For trucks up to 20,000 pounds gross load a short turntable is used and a longer one is furnished for all sizes up to 25,000 pounds with wheel base not exceeding 170 inches. It can be dragged from one job to another and smoothes the subgrade instead of cutting it; or it can be transported on wheels, or knocked down and put on a truck.

By the use of a turntable, a truck can turn at the mixer in half the time it could without, thus increasing the number of trips per day; there is a saving of tire and truck repairs caused by the hard work of turning on sub-grade; the sub-grade is not cut up, and there is less danger of damage to forms and displacing of them.

JOHNSON DEMOUNTABLE BIN

The C S. Johnson Company manufactures a demountable bin with automatic measuring hoppers. The bins are built of steel in sections that interlock, no bolts being required nor concrete foundations. It is claimed that they can be erected or taken down in less than two hours, can be transported by trucks, and need only as foundation a firm soil smoothed off and planked over. The bins are either single-compartment, for use with large stock piles, or two-compartment for use with the usual stock piles. With these a truck or batch box can be loaded in five seconds. One man operates them and the valves are said to be jam-proof. The cost is little greater than that of an all-wood bin.

HEATING CONCRETE IN MIXER

The Aeroil Burner Company furnishes a kerosene flame heater by use of which the makers claim that concrete can be turned out in zero weather with a temperature of from 70 to 90 degrees and that the mix will remain warm for 48 to 56 hours after being poured. The apparatus consists of a large kerosene blow torch fed from an oil pressure tank through a 12-foot length of flexible oil hose, a flame-distributing pipe throwing the flame into the mixer at the proper angle without interfering with the charging hopper. The heater for mixers up to 21 cubic foot capacity consumes about 2½ gallons of oil an hour.

NEWS OF THE SOCIETIES

CALENDAR

April 24—CLEVELAND ENGINEERING SOCIETY. Joint meeting with Ceramic Society at Hotel Winton, Cleveland.

April 25—AFFILIATED TECHNICAL SOCIETIES OF BOSTON. Affiliation meeting, Tremont Temple, Boston.

April 30 — NORTHEASTERN SECTION, AM. SOC'Y. OF CIVIL ENGINEERS. Meeting at Tremont Temple, Boston.

April 30-May 2—NATIONAL CONFERENCE ON CITY PLANNING. Annual conference at the Southern Hotel, Baltimore, Md. Secretary, Flavel Shurtleff, 130 East 22nd St., New York City.

May 7-9—AMERICAN ASSOCIATION OF ENGINEERS. Ninth annual convention, Norfolk, Va. Secretary, C. E. Drayer, Chicago.

May 10 — NATIONAL HIGHWAY TRAFFIC ASSOCIATION. Annual meeting at Automobile Club of America, New York City. Secretary, Elmer Thompson.

May 21-25 — AMERICAN WATER WORKS ASSOCIATION. Annual convention, Statler Hotel, Detroit, Mich. Secretary, John M. Diven, 152 West 71st Street, New York City.

June 15—TEXAS WATER WORKS ASSOCIATION. Joint Convention with Southwest Water Works Association, Wichita Falls, Texas. Secretary, V. M. Ehlers, Austin, Texas.

June 25th to 29th. AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

Oct. 8-13—AMERICAN PUBLIC HEALTH ASSOCIATION. Fifty-second annual meeting, Boston, Mass. Secretary, A. W. Hedrich, New York City.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Memphis, Tenn. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. — OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

AMERICAN WATER WORKS ASSOCIATION

The Transportation Committee has arranged a special train for the convention at Detroit on May 21st-25th. This train leaves New York City via the D. L. & W. R. R. at 2 P. M. (Standard Time) on May 20, arriving in Detroit at 7:10 A. M. A train connecting at New York leaves Atlantic City at 9:00 A. M. via Pennsylvania R. R.; and one from Philadelphia at 7:45 A. M. connects at Stroudsburg at 11:59 A. M.

The fare from New York, one way, is $23.29, lower berth $6.38, dinner $1.50; from Baltimore (via Stroudsburg) $23.98, parlor car seat to Stroudsburg and lower berth to Detroit, $7.43. Half fare returning if 250 certificates are presented.

NATIONAL CONFERENCE ON CITY PLANNING

The 1923 conference will be held April 30 to May 2 at the Southern Hotel, Baltimore, Md. The program is as follows:

MONDAY, APRIL 30TH

9:00 to 11:00 a. m. Registration at the Conference headquarters, the Southern Hotel.

12:00 m. Luncheon.

Address of Welcome and Reply.

2:00 p. m. First Conference Session.

The Principles of Regional Planning. George B. Ford, New York City. Discussion by Charles H. Cheney, Redondo Beach, California.

Inter and Intra Urban Transit and Traffic as a Regional Planning Problem. George A. Damon, Pasadena, California.

Terminals for the Baltimore Region. W. W. Emmart, Baltimore.

8:00 p. m. Second Conference Session.

The Relation of Washington to a Plan of the Baltimore Region. Colonel C. Keller, Engineer Commissioner, District of Columbia.

Maryland's Relation to a Regional Plan. Jefferson C. Grinnalds, Baltimore.

The Planning of Other Maryland Cities. Colonel D. John Markey, Frederick, Maryland.

Cooperation of Baltimore County and Surrounding Territory. Samuel A. Green, Baltimore.

TUESDAY, MAY 1ST

10:00 a. m. Third Conference Session.

Zoning in Relation to Regional Planning. Robert H. Whitten, Cleveland.

Court Decisions on Zoning Up to Date. Edward M. Bassett, New York City.

Zoning an Essential Part of the Baltimore Plan. James Carey Martien, Baltimore.

12:30 p. m. Luncheon.

2:00 p. m. Auto Trip.

8:00 p. m. Fourth Conference Session.

Baltimore's Planning Problems.

School Building Program in Relation to City Planning and Zoning. Henry G. Perring, Supervising Engineer, Public Improvement Commission, Baltimore.

Baltimore's Park System as an Integral Part of the General Plan. J. Cookman Boyd, President of the Park Board.

Port Development an Important Feature in Baltimore's City Plan. Bancroft Hill, Harbor Engineer, Baltimore.

Water Supply and the Baltimore Plan. William A. Megraw, Water Engineer, Baltimore.

WEDNESDAY, MAY 2ND

10:00 a. m. Fifth Conference Session.

Day and Night Storage and Parking of Automobiles. Hugh E. Young, Chicago.

The Major Street System of the Baltimore Plan. Major Joseph W. Shirley, Baltimore.

12:30 p. m. Luncheon.

2:00 p. m. Sixth Conference Session. An open session for the discussion of questions submitted by members of the Conference.

4:00 p. m. Business Session.

7:30 p. m. Annual Dinner.

BOSTON SOCIETY OF CIVIL ENGINEERS

The following officers were elected at the 75th annual meeting, which was held on March 21:

Society. F. M. Gunby, President; R. K. Hale, Vice-President; F. O. Whitney, Treasurer; J. B. Babcock, Secretary; A. T. Safford and D. M. Wood, Directors; G. A. Carpenter, H. H. Chase and L. S. Cowles, Nominating Committee.

Sanitary Section. J. P. Wentworth, Chairman; D. M. Wood, Vice-Chairman; H. P. Eddy, Jr., Clerk; T. F. Bowes, R. W. Loud and W. P. Morse, Executive Committee.

Designers Section. W. W. Clifford, Chairman; J. S. Crandall, Vice-Chairman; W. F. Pike, Clerk; E. H. Cameron, P. W. Taylor and Hale Sutherland, Executive Committee.

PENNSYLVANIA HIGHWAY CONFERENCE

March 23 and 24 marked the highway conference called by Governor Pinchot of Pennsylvania, at which over twenty states were represented. Brief papers on the following subjects were given: "Highway Construction and Maintenance from the National Standpoint," by Thomas H. MacDonald; "Experience by the States in Road Construction," by Frederick Stuart Greene; "Experience by the States in Traffic Regulation," by Charles J. Bennett, and "Experience by the States in Road Maintenance," by H. G. Shirley.

Governor Pinchot entertained the delegates at dinner on Friday evening, and on Saturday Commissioner P. D. Wright, of the Pennsylvania Highway Department, presided at a luncheon and round table discussion.

A committee was named to summarize the conclusions of the conference, with Mr. MacDonald as chairman and Col. Greene, Mr. Dean, Frank Page of North Carolina, Paul D. Sargent of Maine, Clifford Older of Illinois, Mr. Shirley, Chas. J. Bennet of Connecticut and Wm. H. Connell of Pennsylvania as the other members.

The report of the committee is given under the heads "Administration," "Finance," "Construction" and "Maintenance." Under the first, state authorities are urged to provide strong engineering control in the administrative and executive work of state highway departments, and engineering supervision of construction, maintenance and operation, with elimination of politics and continuity of service. The department and not the legislature should select the roads for improvement.

Under finances it recommends a budget system, recovery of cost in proportion to benefits conferred; "pay as you go" or serial bonds for permanent features, and license and gasoline

tax for maintenance and reconstruction.

Construction: It is impracticable to select any one standard type of pavement for even a single state. Under first class pavements the committee gave granite block, brick and bituminous tops on concrete base, and concrete pavement; under second class, the so-called flexible types; and under third class, sand-clay or other top soil. Progressive construction is a practical and at times the most advantageous method of construction.

Maintenance: No construction should be undertaken unless adequate maintenance is provided for. The engineer who builds the road should maintain it. A traffic bureau should make highway transport surveys in all their phases. Uniform motor vehicle laws and regulations throughout the country are desirable, including dimensions of vehicles and wheel loads. Standard protection devices, requirement of licenses for drivers, simple direction signs, and elimination of all grade crossings are urged.

TOPEKA ENGINEERS' CLUB

The following officers were elected for 1923 at a recent meeting of the Topeka Engineers' Club: F. W. Epps, bridge engineer of the Kansas Highway Commission, president; first vice-president, R. H. Pennartz; second vice-president, W. S. Lammers; secretary and publicity director, H. E. Buchanan, and treasurer, Clyde A. Funchess.

CALIFORNIA COUNTY SURVEYORS' ASSOCIATION

The following officers were elected for the coming year at the annual meeting of the California County Surveyors' Association, held on March 12 at Sacramento: H. H. Hume, county engineer of Butte County, president; Lloyd Bowman, county surveyor of Santa Cruz County, secretary.

ILLINOIS SECTION, AMERICAN WATER WORKS ASS'N.

The fifteenth annual meeting of the Illinois Section, A. W. W. A., was held in Decatur on March 21 and 22. W. S. Cramer, president of the Association, and many others from outside the state were present.

The program included papers on "Water Works Development at Mt. Pulaski," by Alex Van Praag, Jr.; "Recent Developments in the Field of Stray Current Electrolysis," by E. R. Shepard; "The Public Utility Fuel Problem," by C. M. Roos; "Decatur Water Supply," by Wilson M. Bering; "Decatur Sanitary District," by F. D. Holbrook; "Decatur Water Supply and Sewerage Improvements," by S. A. Greeley; "Municipal Water Softening in Illinois," by A. M. Buswill; "Customer Ownership of Public Utility Securities," by F. C. Amsbary; and "Inspection and Supervision of Filtration Plants in Illinois," by H. F. Ferguson.

A visit was made to the Decatur dam, filtration plant, sewage treatment plant, and the plant of the H. Mueller Mfg. Co. on the bank of the new city reservoir. Luncheon was served at the last named.

The officers for the coming year are:

Chairman: C. M. Roos, Mgr., Cairo Water Co., Cairo, Ill.

V. Chairman: A. M. Buswell, Chief, State Water Survey Division, Urbana, Illinois.

Trustees: W. R. Gelston, Supt., Water Works Commission, Quincy, Illinois; W. E. Lautz, Mgr., Pekin Water Works Co., Pekin, Illinois.

Treasurer: H. E. Keeler, the Rookery, Chicago, Illinois.

Secretary, G. C. Habermeyer, Engr., State Water Survey Division, Urbana, Illinois.

PERSONALS

Sloan, W. J., of Nutley, N. J., was on April 10 appointed state highway engineer of New Jersey. During the war he was a major in the U. S. Engineer Corps.

Black, Walter G., of Mandan, N. D., on April 1 assumed the duties of state engineer of North Dakota. He is a member of the firm of Black & Griffin, and was last year president of the North Dakota chapter of the American Association of Engineers.

Cox, Lawrence W., formerly city engineer of Dubuque, Iowa, has been appointed city manager of Maywood, Iowa.

Parks, L. D., has changed his position from that of county engineer of Comanche and Erath counties, Texas, to that of county engineer of Eastland county, Texas.

Farsgard, L. O., formerly city engineer of Palestine, Texas, is now city engineer of Nacogdoches.

Richards, Arthur, recently bridge engineer of Franklin county, Ohio, has been appointed city engineer of Chillicothe.

Sprague, Charles D., has been appointed village manager for South Charleston, Ohio, in place of P. H. Cheney, who has recently been made postmaster of that village.

Farnsworth, G. E., has been appointed assistant road engineer for the county of Riverside, with office at Santa Monica, California. Mr. Farnsworth was formrely resident engineer with the Oregon State Highway Commission.

Bankston, E. F., has been appointed project engineer for the Missouri Highway Department. Mr. Bankston was formerly connected with Nez Perce county, Idaho, in the capacity of assistant bridge engineer for the county engineer.

Parsons, R. O., has been appointed resident engineer of the Kentucky State Department of Roads. Mr. Parsons formerly acted as assistant engineer in the Georgia State Highway Department.

Near, W. P., has been appointed city engineer of London, Ontario. Mr. Near has resigned as city engineer of St. Catherines, Ontario, which position he has held for the past ten years.

Lingley, A. G., has been appointed construction engineer of the Jefferson City Highway Department. W. M. Spann succeeds Mr. Lingley in his former position at division engineer for Division 4 of the Missouri State Highway Department.

Matthews, Homer M., has been chosen engineer of the bridge department of the Texas State Highway Department. Mr. Matthews formerly acted as office engineer for the Mexican Light and Power Company.

Angle, James M., has been appointed highway bridge engineer, United States Bureau of Public Roads, with office at Washington, D. C.

Sverdrup, L. J., has been appointed assistant bridge engineer for the Missouri State Highway Department.

INDUSTRIAL NOTES

Hazen & Whipple, civil engineers, have removed their office to 25 West 43rd street, New York City.

Burns & McDonnell Engineering Company, of Kansas City, Mo., has opened a new engineering office at Los Angeles, in the Marsh-Strong Building, with Chester A. Smith, a member of the firm, in charge. This office will handle the half-million dollar Flagstaff water supply project, and one for Lewiston, Idaho, to cost about the same.

The Cement Gun Contracting Company is the name under which the Traylor-Dewey Contracting Company has recently been reincorporated. It will continue to specialize in construction and repair with the cement gun and construct reservoirs and other concrete structures.

Heltzel Steel Form and Iron Company. William J. Savage, who for four years has been connected with the company, has recently been appointed vice-president.

Union Water Meter Company. Guy C. Northrop has become associated with the sales department of this company for New England territory. He served for five years with the General Electric Company, was machine gun officer during the war, and since then has been with the Pittsburgh Meter Company.

Blaw-Knox Company. Major Frederic E. Wheeler, formerly president of Finlay-Wheeler, Inc., dealers in contractors' equipment, has joined the Chicago sales staff of this company. He was for four years general manager of Finlay-Wheeler, three years superintendent for the Donner Steel Co. and two years resident engineer for the Erie Railroad.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

WESTERN ELEVATING GRADER

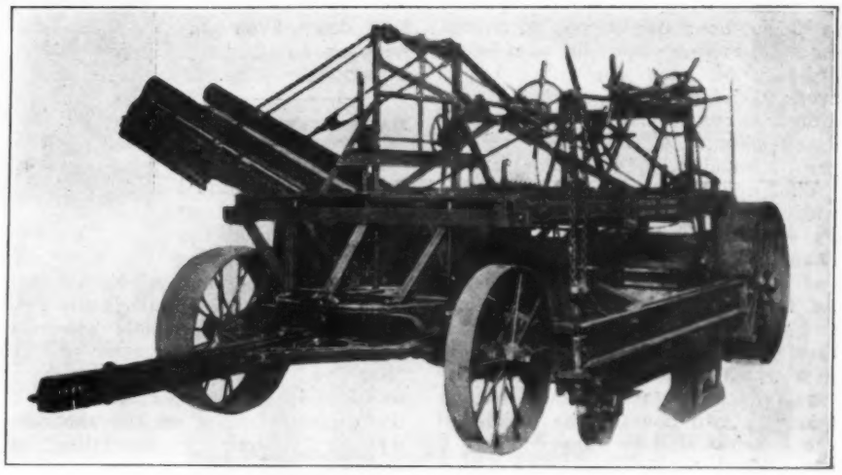
The 1923 model of the elevating grader manufactured by the Western Wheeled Scraper Company has several improvements over the graders heretofore turned out by that company, these including a new elevator, an improved disc, a new hitch, a sturdier frame and an improved front bolster The aim has been to adapt it perfectly to use with a heavy tractor, which exerts stresses unknown to horse-drawn machines. The company gives credit for much of its success in improving this machine to an experienced "trouble man" loaned by one of the contractors in the Mississippi levee section.

The elevator has been modified to maintain perfect alignment by use of an adjustable hinge, enabling the contractor to keep the sprockets in line and make the belt run true. Instead of chains for tightening the belt, the 1923 model has rods and turnbuckles. The new machine is made with either steerable tongue or stub engine tongue, as desired, the demand for the latter appearing to be greater than for the former.

CHEAPER LINK-BELT CONVEYORS.

The Link-Belt Company recently announced that the price of its Cub portable belt conveyor has been cut 16%, or from $700 to $585, complete with 2-h. p. electric motor. Owing to the number of orders on hand, the manufacturer of this loader has been put on a quantity production basis, resulting in a large saving in manufacture.

These conveyors are used for loading and unloading cars, trucks and wagons, handling any loose material such as coal, sand, stone, gravel, etc., instead of using hand shovellers. The company claims that the Cub is an even more sturdy loader than the machine that sold at a higher figure and that it weighs almost twice as much as similar machines of its size and class. The conveyor belt, 18 inches wide, is guaranteed against cutting or fraying. It is designed to run at 250 feet per minute, at which rate and with uniform feed it has a capacity of 45 cubic feet per minute.



"WESTERN" EXCAVATOR AND LOADER

CARR ROAD FORM

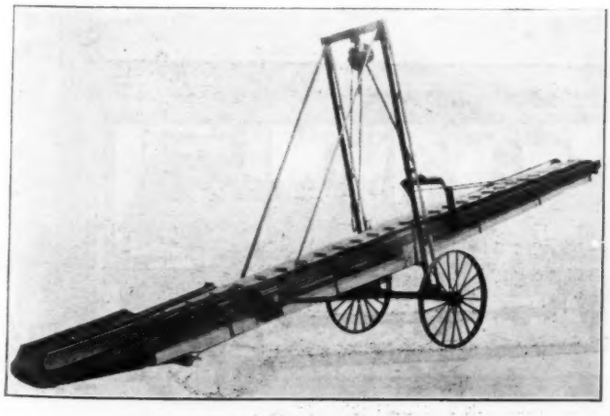
The Lakewood Engineering Company has just placed on the market the Carr Road Form, which is a new development although they were used on several jobs last season in order to thoroughly try them out before placing them on the market.

The form is made of 3-16 inch metal in sections 12 feet long, which thus gives 20 per cent less number of joints than the customary 10-foot length. One of the most important features is the line point top surface, which is secured by the rounded top, so that no concrete or stones can lodge there. The sections are rigidly jointed together in exact line and grade by wedge members and are held in position by stakes which can be driven anywhere along the form.

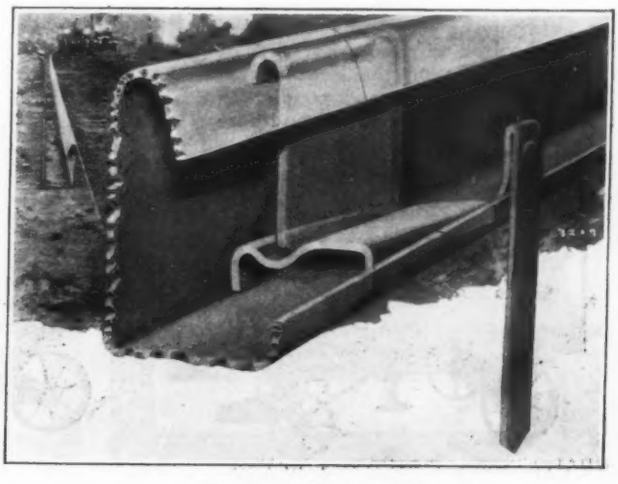
TOTMAN ASPHALT PLANT

The Totman Asphalt Plant, which is furnished by the Edward R. Bacon Company, consists of three units, a dryer (Darby patent), a lower structure with mixer, air cylinder, main line shaft, winch and asphalt pump; and an upper structure with bins, screens, weighing devices and elevator.

The plant was developed by Frank Totman, general superintendent for one of the oldest street paving contractors in the Far West. It resembles a stationary asphalt plant as to general arrangements and capacity, but is of all-steel construction and is



CUB PORTABLE BELT CONVEYOR



CARR ROAD FORM

divided horizontally into two vertical structures, one mounted on the other, so that it is readily portable. A capacity is claimed of 200 tons in eight hours. The dryer is of the tubular revolving type entirely self-contained and is guaranteed to heat to 250 degrees Fahrenheit 22 tons of 10-mesh sand per hour or 30 tons of mixed sand and broken stone; the sand being ordinary pit sand containing 1 per cent. to 5 per cent. water. Under ordinary conditions the dryer consumes about 1½ gallons of fuel oil per thousand pounds of aggregate.

The upper structure is equipped with a running gear and is mounted by putting two 8x12-inch skids with channel tracks in position with one end on the ground and the other end on the top of the lower structure, and over this drawing the upper structure to position by means of a worm gear winch built into the lower structure, which operation would occupy two men two hours. The weight of the heaviest unit is approximately 7 tons. Both upper and lower structures are mounted on road wheels. Either portable or stationary asphalt kettles are furnished, as desired.

THE TRAILMOBILE

For ordinary contractor's use, the "Semi-Trailmobile" is recommended by the Trailmobile Company. They are generally used in fleets of two or more to one truck. Because of the almost instantly operated props and automatic fifth wheel, it requires but a moment to uncouple one "Trailmobile" and pick up another.

In order to secure economy by hauling the largest quantity of loose materials that one driver can handle, the company designed the "roller dump body" with five tons capacity, which holds three yards at water level or actually four to five tons of level sand or crushed stone, while six tons may be obtained by crowning. In dumping, the load is not lifted, but the body first slides and then tips by a simple hand mechanism.

A special chassis has been designed for utilizing the great tractive power of the Fordson tractor, about 30% of the load resting on the hubs of the Fordson. The bridge and coupler on the Fordson and the drawbar and nose of different sizes and styles of "Trailmobiles" all interchange, so that several "Trailmobiles" can be coupled behind one Fordson.

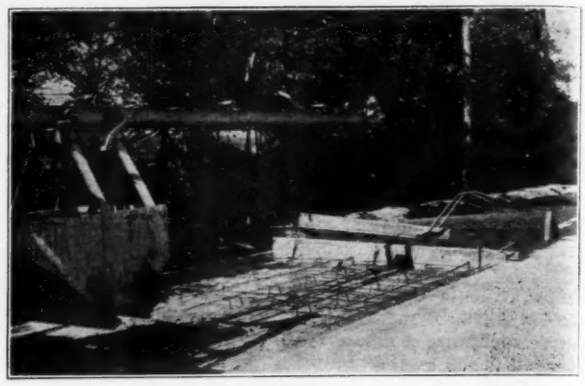
"Trailmobiles" are made as 2½-ton hand-hoist dump, 5-ton platform or rolloff dump, and 6-ton low drag.

HAVEMEYER REINFORCING BARS

The Havemeyer Deformed Bar Road Reinforcement consists of steel reinforcing bars cut to length, and shop bent where required, which are assembled into units or mats in the field by the use of a portable assembly frame and tied at the intersection with "Bar-Tys." The mats are generally so formed as to support the bars in the correct position on the subgrade without preliminary concreting or screeding.

In the field the steel is assembled on the assembly frame and tied together by two laborers and the complete mat is then lifted out of the frame and placed along the road ready for use. During concreting, the mats are lifted by two laborers and placed directly on the subgrade behind the mixer and concreting performed as though no reinforcement were there.

The reinforcement can be furnished with self-supporting bottom, or top, or top and bottom reinforcement, or top reinforcements and marginal bottom.



A MAT OF HAVEMEYER BARS IN PLACE

ROAD CONTRACTORS' PUMPING PLANTS

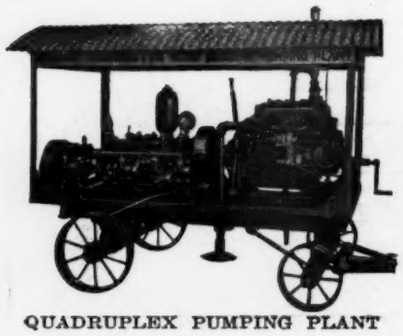
The Barnes Manufacturing Company furnishes highway contractors with pumping plants that they recommend for the hard service that a highway contract involves for furnishing water for concrete, etc., through 2-inch or 2½-inch pipe for long distances. The pump is adapted for 400 or 500 pounds pressure, thus permitting the use of 2-inch pipe where a lower pressure would require 2½-inch or 3-inch. The pumps are made triplex and quadruplex, built to run at moderate speed. The plungers are outside packed.

Pumping plants are furnished complete on a truck for transportation. No. 34 contains a triplex pump operated by a 4-cylinder LeRoi engine, 12 to 15 h. p., with a 10-gallon gasoline tank. This is mounted on a heavy riveted steel truck with a galvanized sheet metal housing and removable sides. This plant has a displacement capacity of 2,400 gallons per hour at 53 pump revolutions per minute against a pressure of 400 pounds per square inch. The plant weighs 3,000 pounds and the length over all is 7 feet. No 342-A consists of two complete triplex units each with a 25-30 h. p. 4-cylinder engine and with a common suction and discharge pipe.

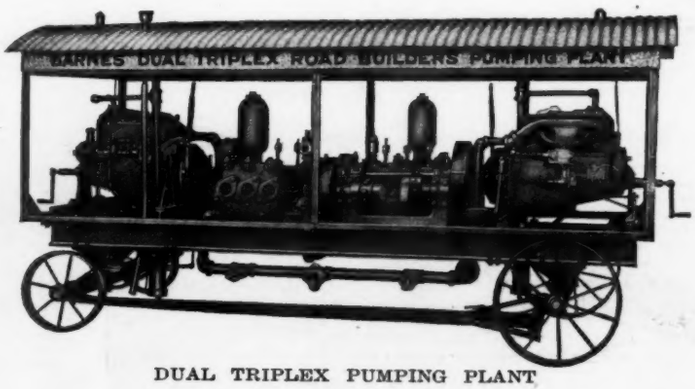
CEMENT SACK CLEANER

A cement sack cleaner is manufactured by the Handy Sack Baler Company. It is made in five sizes with capacities for cleaning from 150 sacks per hour to 1,200 sacks. It is claimed to salvage loose cement averaging ½ per cent. to 1 per cent. of the capacity of the sacks, saving the freight on this weight when returning the sacks as well as securing the use of the cement.

It consists of an all-steel reel covered with heavy wire cloth reinforced with iron bands, revolving in a housing that is practically dust proof and rigid in construction. A charge of sacks in the reel is cleaned in about 15 or 20 minutes. Workmen do not



QUADRUPLEX PUMPING PLANT



DUAL TRIPLEX PUMPING PLANT

MUELLER

No. "E" Drilling Machine

is used for making large drillings on all kinds of water and gas mains, under pressure. Drills ½″ to 1″ holes in any size pipe. One man can operate it.

Mueller "E" Drilling Machine & Calking Tools

Nine out of ten Public Service Corporations use ***MUELLER*** Drilling and Tapping Machines—because they do the work quicker and better—because they last longer and are easier to operate.

MUELLER Tools are made from superfine steel, are hand-tempered and are made in shapes to meet every need.

It will pay you well to see that your workmen are not handicapped by poor tools.

Descriptions and prices on request.

H. Mueller Manufacturing Co.,
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Water, Plumbing and Gas Brass Goods and Tools

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Mueller Metals Co., Port Huron, Mich., Makers of "Red Tip" Brass Rod; Welding Rod; Brass and Copper Tubing; Forgings and Castings in Brass and Bronze; also Brass Screw Machined Products.

object to handling and baling cleaned sacks as they do uncleaned ones.

SEAVERNS TRUCK LOADER

The Seaverns' Loader is claimed tc have been a pioneer in that field, the first one having been built over seven years ago and being still in service. No feeding devices are used, because it is claimed the machine is so powerful and sturdily built that it can be driven under the piled material to such a depth that it flows by gravity into the buckets. A high chute extending far out from the machine allows the largest trucks to be filled when backed up to the loader without trimming.

The manufacturer is the James B. Seaverns Co., which make special claim for sturdiness and substantial construction with the use of the best grades of malleable iron, high carbon steel and other grades most suitable for their respective duties. Continuous crawl tread is furnished when desired. For power, they are provided with either electric motors of 15-horse power, or 20-horse power 4-cylinder gasoline motor units where current is not available. All parts are guaranteed as to material and workmanship. A capacity to load two or three cubic yards per minute of damp sand is one of the guarantees.

BATCH CARS FOR ROAD BUILDING

The Koppel Industrial Car & Equipment Company has ready for 1923 road-building its latest development in multiple batch box cars. These are designed for 24-inch gauge track, are 16 feet long with side sills of I-beams and center and end sills of heavy channels. The trucks are of the beam type; the wheels of chilled iron 14 inches diameter, equipped with double spring suspended brass caged roller bearings. The car has a quick-acting compensating ratchet brake. It has a capacity for carrying five batch boxes each holding 31 cubic feet. A larger truck is manufactured designed for 36-inch gauge track, with M. C. B. diamond arch bar trucks and has a capacity of five batch boxes each of 54 cubic feet capacity.

Other cars are made with a capacity of two boxes and of either oval or square frame. Among other features is the spring draft gear which is said to absorb heavy bumper shocks and minimize derailment troubles.

KOPPEL FIVE-BATCH CAR

EVINRUDE PUMP IMPROVEMENT

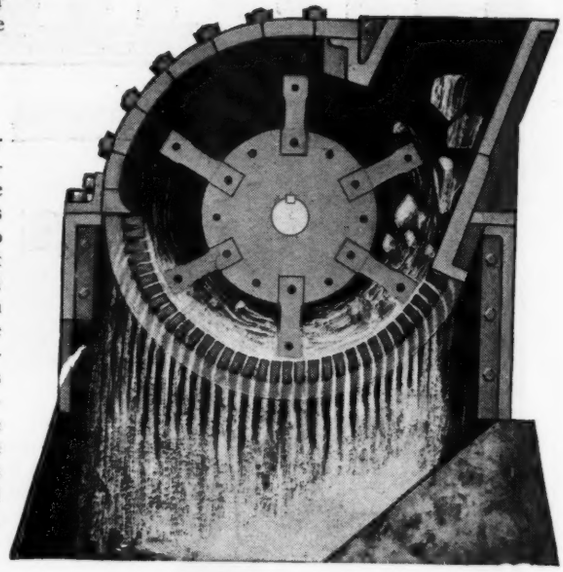
The Evinrude Motor Company announces a recent improvement in the bearing equipment of its centrifugal pump. To support the pump shaft at the lower end a ball thrust bearing has been provided in place of the lignum vitae plug heretofore used. This improvement, which increases the life of the lower bearings and the efficiency of the pump operation, can be installed in pumps already in use.

PENNSYLVANIA EXPANSION JOINT

This joint, manufactured by the Asphalt Products Company, is the result of an endeavor on that company's part "to produce an expansion joint that will overcome as much as possible the difficulties which are being experienced in the use of the present types." In the exhibit by the New Jersey State Highway Association at the Chicago Road Show there were shown cores cut from various concrete highways at the expansion joints, illustrating how the various types appeared after some years of service. It is reported that, so far as actual contraction and expansion efficiency were concerned, the pure asphalt type of joint was markedly superior.. The Pennsylvania joint approximates the purer asphalt joint, but is easier to handle. It is 97% pure asphalt, most of the remaining 3% being hair impregnated with it which adds to its tensile strength and rigidity and consequently to the ease in handling. It is claimed that it will adhere to the concrete as strongly as pure asphalt.

THE JEFFREY STONE PULVERIZER

A machine especially adapted for producing binding material for water-bound macadam, top dressing or filler, is furnished by the Jeffrey Manufacturing Company under the name of the "Jeffrey Stone Pulverizer." This



JEFFREY STONE PULVERIZER

is a swing hammer pulverizer which, fed with hard material up to 3 inches and softer material in larger pieces, reduces the material so that it will all pass through ⅛-inch openings or larger. The stone fed from above falls down on a sloping breaker plate where it is engaged by the rapidly revolving hammers and is carried over a cage of screen bears, where all that is sufficiently fine passes through while the coarser pieces are carried around with the hammers for a second reduction on the breaker plate, the larger pieces, however, being broken by contact with a top breaker plate before reaching the sloping plate the second time.

The pulverizer may be belted from a line shaft, steam engine or electric motor; or an electric motor may be coupld directly if of suitable speed, a flexible coupling being supplied for this purpose. The screen bars are furnished with any standard machine with clear openings of ⅛-inch, ¼-inch, ⅜-inch, ½-inch, ¾-inch or 1-inch.

Approximate speeds varying from 1,200 revolutions for the 24-inch pulverizer to 900 revolutions for the 42-inch are perhaps the average. While the capacities and results will vary with the different kinds of material, when pulverizing limestone passed through ⅛-inch openings, the former of these has a capacity of approximately one to two tons per hour, and the 42-inch, the largest size, of approximately 15 to 20 tons. With larger screen openings the capacity will, of course, be greater.

THE MIXERMOBILE

The Milwaukee Concrete Mixer Company manufactures a concrete mixer which it calls the Mixermobile, for which it claims unequalled mobil-

A FORD
in the Pump Field

After heavy rains, flooded basements in the business districts of Portland, Oregon are pumped out with Evinrude Centrifugals.

Disposes of Water You Don't Want

THE Evinrude Centrifugal Pump does its work at a lower cost than any other pumping outfit made. It goes where other pumps cannot follow. May be lowered into ditch, excavation or caisson and submerged in the water. Pumps 5,000 gallons an hour at a 20 foot head — with or without a suction line. Requires no "installation".

Wherever there's drainage water to be disposed of—in basements, building excavations, mines, quarries, gravel pits—an Evinrude will do the job quickly, efficiently and economically. Bridge builders use it for emptying coffer dams, sewer contractors for work in close quarters, public service and traction companies for underground work. Ideal priming outfit for sand dredge pumps. Drains out the holds of barges and freighters.

The Evinrude is light, compact, handy — weighs only 115 pounds complete — easily moved by two men. Power is supplied by a 2 H.P. Evinrude gasoline engine, the same as now used in more than 150,000 Evinrude rowboat motors.

Dealers: This is the biggest season for pump sales. Write or wire for proposition — now. Some desirable territory still open.

EVINRUDE MOTOR COMPANY
56 Lake Street Milwaukee, Wis.

5000 GALLONS per hour at 20 ft. head

EVINRUDE CENTRIFUGAL PUMP

For users requiring a more powerful pump the Evinrude No. 1½ is recommended. 7400 gallons per hour at a 20-ft. head —3½ h.p. Evinrude motor. Price $175.

Price: $150.00 F.O.B. MILWAUKEE

ity, simplicity of operation, saving of labor and reliability. It is mounted on a one-ton Ford truck and thus can be transported from job to job rapidly and is operated by the truck motor, which is one of twenty horse-power. Because of the reliability of the Ford engine, engine trouble delays are reduced to a minimum. Because of the support given by the truck springs, the mixer is not shaken to pieces during transportation.

The capacity is given as seven cubic feet C. M. A. rating. The drum is 42 inches diameter and 36½ inches long and has a speed of seventeen r. p. m. The discharge chute is pivoted with a 45-degree slope. The power loader has a hoisting cable 5/16-inch diameter and swings on a pivot to a discharge angle of 53 degrees. The water tank has a capacity of 15 gallons. The levers can be operated from either the driver's seat or the ground. By removing four clamps the entire mixer mechanism can be detached and the apparatus converted into a one-ton truck.

INDUSTRIAL NOTES

HEIL COMPANY OFFICES

The Chicago offices of the Heil Company, manufacturers of truck and dump bodies, hoists, etc. have been moved to 2422 Cottage Grove Avenue, where twenty men are employed to mount the Heil hoist, body and tank equipment. H. F. Kneppreth is manager of the Chicago branch. The company has established daily truck service to Chicago from its factory in Milwaukee, providing immediate delivery on orders.

The New York office also has moved to 796 Tenth Avenue, near 53rd Street. In Denver, Colorado, the H. P. Wilson Company, at 17th and Blake Streets, has been made the Heil distributor for that district.

BLAW-KNOX COMPANY

William H. Schutte, who has for some time been connected with the Chicago selling force of the Blaw-Knox Company, has been promoted to managership at its Chicago office and has already assumed his new duties.

PURCHASE OF MIETZ OIL ENGINE BUSINESS

The Charter Gas Engine Company of Sterling, Illinois, announces the purchase of the entire business of the August Mietz Corporation, manufacturers of Mietz Oil Engines (also known as Mietz & Weiss), and of the Reliance Oil Engine Corporation. This effects a merger and consolidation under one management of two of the oldest and best-known internal combustion engines. The Mietz was the pioneer semi-Diesel oil engine of the world, the first Mietz having been built in 1895. The Charter engine was the pioneer gasoline engine, the first being built in 1896 and being, so far as is known, the first commercially successful engine in the world to use liquid fuel.

The Charter Gas Engine Company is moving to its plant at Sterling all of the physical assets of the Mietz Corporation, and users of these engines will be able from now on to obtain prompt and reliable service from that company. A number of the personnel of the August Mietz Corporation have been engaged by the Charter Company and additional floor space is to be added to its plant, almost doubling the present area.

MIXERMOBILE MOUNTED ON ONE-TON FORD TRUCK

LOCK JOINT PIPE COMPANY

David A. Decker, formerly principal assistant in the Department of Public Works of Norfolk, Va., has resigned and been made engineer in charge of construction of the 52-mile line of 60-inch concrete pressure pipe being built for Tulsa, Okla., by the Lock Joint Pipe Company.

PETERSON, HOPKINS & COMPANY

Ivan C. Peterson and L. O. Hopkins, formerly manager and chief engineer, respectively, of the Chicago Bascule Bridge Company, on March 1st severed their connections with that company and are engaged in engineering practice under the above firm name, with offices at 118 North LaSalle Street, Chicago.

"AVERY GOOD ROADS NEWS"

The Avery Company is sending to public officials and contractors a new edition of the "Avery Good Roads News," giving illustrations of the use of Avery machinery by contractors and others. The leading article is entitled, "Building Roads Good and Keeping Them Smooth."

ROCK DRILL STEEL

The Sullivan Machinery Company has published a "Handbook of Rock Drill Steel, Its Selection, Heating, Forging and Tempering." This is an instruction book for the care and use of Sullivan drill sharpeners and drill steel furnaces. The company has endeavored to furnish information that would not be in an ordinary machine instruction book concerning special uses of the sharpener; also some theoretical matter on the treatment of steel expressed in as simple terms as possible, description of the layout of a drill sharpening shop, a short discussion of the proper heating of drill steel, and special specifications for drill steel to enable the purchaser to select the proper steel for drills. The book has 80 pages and is well illustrated.

FOUR-ACRE LAWNMOWER

A lawnmower which can be used for parks and other large areas and easily steered around shrubs, flower beds, etc., is being placed on the market by Jacobson Manufacturing Company. It is propelled and the blades operated by motor and is said to be the smallest power mower on the market, weighing only 200 pounds.

NEWS OF THE SOCIETIES

CALENDAR

May 21-25 — AMERICAN WATER WORKS ASSOCIATION. Annual convention, Statler Hotel, Detroit, Mich. Secretary, John M. Diven, 152 West 71st Street, New York City.

June 15—TEXAS WATER WORKS ASSOCIATION. Joint Convention with Southwest Water Works Association, Wichita Falls, Texas. Secretary, V. M. Ehlers, Austin, Texas.

June 25th to 29th. AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

Sept. 11-14—AMERICAN SOCIETY OF SANITARY ENGINEERS. Annual convention at Davenport, Ia.

Oct. 8-13—AMERICAN PUBLIC HEALTH ASSOCIATION. Fifty-second annual meeting, Boston, Mass. Secretary, A. W. Hedrich, New York City.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Memphis, Tenn. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. — OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

CITY PLANNING CONFERENCE

The 1923 conference was held in Baltimore on April 30 to May 2, according to the program given in these columns last month. The conference adopted a resolution advocating state legislation to authorize county authorities to provide for county-wide planning and for co-operation between counties.

George B. Ford was elected president and John Nolen vice-president. Flavell Shurtleff was re-elected secretary.

NATIONAL HIGHWAY TRAFFIC ASSOCIATION

The annual meeting of this association was held May 10th in New York City, where papers were read at the afternoon and evening sessions, between which an informal dinner was served to those in attendance. The election of officers resulted in the re-election of Prof. Arthur H. Blanchard as president and Elmer Thompson as secretary. President Blanchard presided at the afternoon session and Vice-President David Beecroft at the evening session. At the afternoon session reports were submitted by the committees on Rural Motor Express, J. H. Collins chairman; Traffic Center Lines on Roadways, Frank T. Sheets chairman; Status of the Construction of Highway Curves and Recommended Practice to Increase Safety to Traffic, H. Eltinge Breed chairman; Highway Danger Signs, G. C. Dillman chairman; Mechanical Devices for Highway Traffic Regulation, Prof. Louis W. McIntyre chairman; Regulations Covering Speeds, Weights and Dimensions of Motor Trucks and Trailers, George H. Pride chairman; Regulation of Overloading of Motor Trucks, David C. Fenner chairman; and Highway Transport Clearing Houses, Tom Snyder chairman.

These reports were followed by the annual report of the Board of Directors, in which were included the reports of the secretary and treasurer.

In the evening, reports were submitted by the committees on Safety Regulations at Railroad Crossings, H. A. Rowe chairman; Equitable Distribution of Cost of Construction, Interest on Bonds, Replacements and Maintenance of State Highways, William H. Connell chairman; and Highway Transport Franchises, Harry Meixell chairman. A paper entitled: "The Demand for National Transportation and the Function of Streets and Highways," illustrated with diagrams and tables thrown upon the screen, was presented by J. Rowland Bibbins, chairman of the National Committee on Development of Transportation and consulting transportation engineer.

Most of the reports were comparatively brief and were discussed by a number of those present. In the matter of danger signs, it was recommended that red be confined to directions for making a complete stop, and green to precaution signals meaning "run slow," and that laws and ordinances be passed by states and municipalities forbidding the use of red for anything except the actual presence of danger requiring actual stopping. Provision should also be made for preventing the erection of signs or anything else that will interfere with the view at railroad crossings and the location of advertising or any other than official signs between precaution signals and a crossing.

Representatives of several railroads were present and entered into the discussion of safety at railroad highway crossings. The consensus of opinion by them was that the only practicable method of eliminating or reducing accident at such crossings was by the education of the public, it having been found that precautionary signals and railroad gates were not effective.

The motor truck standards adopted by the National Automobile Chamber of Commerce were presented, including the standard caution plate for motor trucks. These standards included limiting the speed to 25 miles an hour for trucks having a gross weight up to 28,000 pounds on pneumatic tires or 4,000 pounds on solid rubber tires, 20 miles on solid rubber tires up to 8,000 pounds, 18 miles up to 12,000 pounds, 16 miles up to 16,000 pounds, and 15 miles for anything above this. Frame widths for commercial vehicles should be either 36 inches or 42 inches, measured back of the seat.

In discussing highway finances, William H. Connell, assistant state highway commissioner of Pennsylvania, emphasized the importance of provision for maintenance. He stated that the method of raising funds for both construction and maintenance would vary with the different states. Some could meet the entire cost on the pay-as-you-go principle, while others would need to issue bonds for construction or capital costs. In Pennsylavnia it has been decided to consider as maintenance not only ordinary repairing but also replacements of guard rails and other details as well as of the pavement, even to the extent of considering a change from a gravel road to a concrete or bituminous pavement as a maintenance cost and paying the same from current income, such income to be derived chiefly from vehicle licensing, gasoline taxes, etc. He stated that an estimate made within the past few weeks on the above basis showed that the state of Pennsylvania would need $25,000,000 a year for road maintenance.

One of the speakers, in order to emphasize the rapidly increasing seriousness of the problem of railroad crossings, stated that the number of automobile licenses last year, about 12,350,000, was so enormous that the mere figures could not be appreciated by the ordinary intelligence, and as an aid to such appreciation he stated that should these automobiles be placed in a continuous line, all in contact, this line would be sufficiently long to extend completely around the borderline of the United States with another line extending from New York to San Francisco, while the manufacturers were at present turning them out in a number sufficient to make a continuous line of vehicles 25 miles long every 24 hours.

In his report, Mr. Pride recommended that the number of trailers be restricted to one on congested roads and to a maximum of seven on those with little travel.

Most of the reports of committees were submitted as progress reports rather than final reports, although none of the committees made a merely formal report but all gave facts concerning progress during the past year along their special lines.

In the formal paper of the evening, Mr. Bibbins presented the results of studies of an enormous mass of statistics concerning cost and amount of traffic and carriers of all descriptions —rail, highway, canal, etc., and showed that transportation had for years been increasing as the square of the popula-

tion. During the past decade the increase in rail transportation had been at a less rate than formerly, while that by highways had shown a rapidly increasing rate of growth, having doubled within the past four years.

FOURTH INTERNATIONAL ROAD CONGRESS

The Fourth International Road Congress was held in Seville, Spain, from the 7th to the 13th of May. The program called for the report of the Executive Committee, the nomination of general and sectional committees and the formal opening of the Congress on Monday the 7th. On Tuesday the subjects for discussion were: "The Surfacing of Roads with Concrete" and "The Development of Motor Transport," an excursion to Guadalquiver being made in the afternoon. On Wednesday the subjects were: "The Use of Bitumen and Asphalt for Surfacing," and "General Traffic Regulations," with an inspection of bull-training in the afternoon. Thursday being a fete day, there were no formal sessions. Friday the subjects discussed were: "Laying Tramway Rails on the Various Kinds of Road Surfaces" and "The Problem of Traffic on Congested Roads and Streets of Towns." Saturday was devoted to clearing up unfinished work of the sections and the closing meeting of the Congress. A bull fight was to be furnished for the entertainment of the guests in the afternoon of Sunday, the 13th, and excursions to Grenada and Cordova on the 14th, 15th and 16th.

During the Congress various entertainments were offered in the form of garden parties, theatres, organ recitals, banquets, etc.

Determined effort has been made during the past year to induce Congress to enter the United States as a member of the Congress and to invite it to hold its next meeting, probably three years from now, in the United States.

AMERICAN WATER WORKS ASSOCIATION

The forty-third annual convention of this association will be held in Detroit May 21st to 25th, inclusive. On Monday, the 21st, the registration office will be open, in the afternoon informal meetings of superintendents will be held and a discussion of waterworks accounts, records and reports, while in the evening there will be an informal reception and dance.

On Tuesday the convention will open at 9 o'clock with the president's address and a business meeting, followed by papers by F. L. Adams on "The Use of Constant and Variable Speed Motors for Driving Water and Sewage Pumps," by Charles B. Burdick on "Water Works Pumping Stations," and by Arthur L. Mullergren on "Determining the Proper Equipment for Pumping Stations."

In the afternoon C. C. Cocert will describe "Methods of Obtaining Stream Flow Records," Scotland G. Highland "Collecting and Publishing Meteorological Data," Dabney H. Maurey will describe "Some Recent Large Water Works Projects" and James W. Armstrong "The Design of the Proposed Baltimore Filter Plant." At the close of this session the several districts will meet to elect members of the nominating committee. In the evening George H. Fenkell will describe "The Water Works of Detroit," and Theodore Leisen "The Detroit Filtration Plant," both with the aid of lantern slides.

On Wednesday morning James R. McClintock will read a paper on "Recent Water Developments at Memphis," Beekman C. Little will discuss "Iodine Treatment of a Water Supply as a Preventive of Goitre," Caleb M. Saville will read a paper on "A Rational Method of Paying for Waterworks Construction," and Frank C. Jordan one on "Municipal Team Work." At 11:30 this morning the selection of a place for the 1924 convention will be made. As for several years past, there will be no nominations or speeches from the floor, but the convention committee will report on the invitations received and all members, including associate members, are entitled to vote.

Wednesday afternoon members and guests will be taken in buses furnished by the Waterworks Manufacturers Association to the Detroit filter plant, where luncheon will be served and a trip will then be taken by boat through Lake St. Clair.

Wednesday evening the program will be furnished by the Waterworks Manufacturers Association, "The Manufacture of a 28-inch Gate Valve" being described by James H. Caldwell; "The Manufacture of Cast-iron Pipe" by John D. Capron, and "The Installation and Recovery of Brass Well Screens" by D. R. Johnson, each illustrated by moving pictures, following which there will be a smoker with the compliments of the Waterworks Manufacturers Association.

On Thursday morning a report on "Watershed Protection" will be presented by H. E. Moses, one on "Industrial Wastes in Relation to Water Supply" by Almon L. Fales, one on "Standards for Satisfactory Drinking Water" by A. W. Freeman and a fourth on "Steps Toward Standardizing Stated Quantities for Slides in Meter Schedules" by Allen Hazen; these being reports of committees of the Standardization Council. At the close of this session the award of the Nicholas S. Hill cup will be announced.

On Thursday afternoon there will be two sessions, one continuing Standardization Council reports and one by the superintendents. At the former Jack J. Hinman, Jr., will present the report of the committee on Standard Methods of Water Analysis, Frank A. Barbour that of the committee on Standard Specifications for Cast-iron Pipe, Edward E. Wall a report on Practical Ranges in Load Factors for Purification Plants, and Robert Spurr Weston one on Colloid Chemistry in Relation to Water Purification.

During the evening, reports will be presented by Leonard A. Day on "Pumping Station Betterments," G. Gale Dixon on "Physical Standards for Distribution Systems," J. M. Diven on "Standardization of Services" and William W. Brush on "Methods and Records of Water Waste Control." Also, Caleb M. Saville will report as chairman for this association of the joint committee with the New England Waterworks Association on "Standard Specifications for Water Meters." During the evening the Chemical and Bacteriological Section will hold a joint meeting with the Detroit section of the American Chemical Society.

At the Superintendents Meeting on Thursday afternoon a paper by Leonard Metcalf entitled, "Clogging of Intakes by Fish" is to be followed by a general discussion on Water Works Intakes. W. C. Hawley is to read a paper entitled, "Averaging Bills" and C. M. Roos one on "Practical Waterworks Accounting"; following which the meeting will be open for general discussion of questions and topics.

On Friday morning the papers are as follows: Charles P. Hoover, "Demonstration of Water Softening"; John M. Chester, "Leakage and Unaccounted-For Water"; F. C. Amsbary, "Use of Portable Air Compressor on Waterworks Distribution System"; Chetwood Smith, "Safeguarding Hot Water Installations"; Charles Fox, "Meter Card Index System," and J. Walter Ackerman, "The Effect of Industrial Uses of Water on Total Consumption"; the last three papers being illustrated with lantern slides. If time permits, questions and topics will be open for discussion.

In the afternoon, preceding a continuation of the discussion of questions and topics, Donald H. Maxwell will read a paper on "The Waterworks Coal Pile," Howard A. Dill one on "A Possible Source of Income for Smaller Plants" and John W. Toyne, "The Use of Fire Hydrants for Purposes Other Than for Extinguishing Fires."

During the morning and afternoon of Friday the Chemical and Bacteriological Section will provide a separate program. This section, in its joint session on Thursday evening, will listen to papers on "The Hardness of American Municipal Water Supplies" by W. D. Collins, "The Physiological Effect of the Mineral Content of Drinking Water" by E. S. Chase and H. C.

(Continued on page 25)

New Appliances

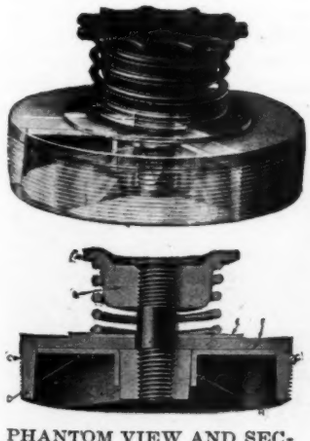
Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

WORTHINGTON "SEAL" VALVE

The Worthington Pump & Machinery Corporation announces the perfection of an entirely different form of valve for pumps which, it is claimed, increases the average pump efficiency, decreases the cost of pumping and continually maintains the capacity of the pump at its maximum point.

Worthington engineers found that the principal cause of leaking valves is excessive wear on the rubber. To overcome the rapid and costly wear, cutting and cracking of ordinary valves, these engineers evolved what is called the "Worthington Seal Valve" for use under conditions that are too strenuous for ordinary valves. This valve is said to assure absolute tightness when closed because the rubber used is flexible and will always sit perfectly at both the hub and the outer rim. Age and continuous use do not cut grooves or cause cracks. There are no screws, bolts, rubber rings, nuts, bushings, or rotating elements. The special feature to which is attributed the durability claimed for the valve is the bottom plate, which is in effect a middle seat for the rubber valve proper. When the valve is closed, this middle seat carries the entire load and prevents the rubber seal from cutting on the seats or ribs. This bottom plate moves up and down with the rubber and so not only acts as a middle seat but is movable with the rubber and helps to keep the valve in shape even when open. Thus all mechanical functions requiring strength and wear resistance are cared for by metal parts and the flexible rubber acts only as a seal against leakage. Even the top of the rubber seal is protected by a thin backing plate which keeps it flat and prevents wear from contact with the spring.

This valve is offered especially for severe and unusual conditions, but of course it can be used for ordinary pumping conditions as well.



PHANTOM VIEW AND SECTION OF SEAL VALVE.

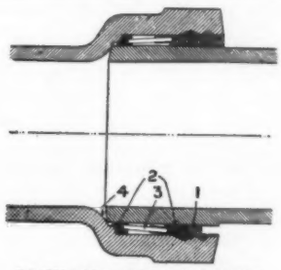
S. & S. COUPLINGS AND TEES

Couplings and tees for water and gas pipes up to 2 inches diameter are manufactured by George H. Snell (successor to Snell & Stone), which Mr. Snell developed while superintendent of the Water Department of Attleboro, Massachusetts. They are used for making connections in trenches without cutting threads, for repairing pipe where small leaks develop and other uses where it is impracticable or undesirable to cut threads on the pipe ends. They may also be used as expansion joints in steam or hot water pipes.

PRECALKED JOINT CAST IRON PIPE

McWane Precalked Joint cast iron pipe is the name of an improved bell and spigot cast iron pipe now being manufactured by the McWane Cast Iron Pipe Company, of Birmingham, Alabama. The feature of this joint is that while it is factory-made, it is a lead-and-hemp joint that retains all the good points of the old reliable trench-made joint, and adds some new ones. No bell holes, lead-pouring, or yarning are necessary in laying McWane pipe, and the speed and ease of laying are thereby greatly increased.

The illustration shows the structure of the joint. It is made in the McWane plant by standing the pipe on end in racks, inserting a mandrel in the bells, and placing the joint materials in them around this mandrel. A layer of braided hemp goes into the bell first, followed by a specially-prepared ring of iron wedges (an automatic joint-tightening device), two more layers of hemp, and a final filling of lead. This lead is then PRECALKED for half of the circumference of the joint. This precalked side is laid downward in the trench, saving any hard bottom calking there. To lay this pipe it is only necessary to insert spigot ends in bells and cold-calk the upper portions of the lead joints. In the small sizes, threaded lengths are provided for connecting with standard screwed cast-iron fittings.



McWANE PRECALKED JOINT.
1—Lead. 2—Braided hemp. 3—Iron wedges, providing automatic joint tightening under deflection. 4—Shoulder of pipe bell.

HEIL SPRINKLING TANK

The Heil Company has developed a tank for sprinkling streets in municipalities of 2,000 to 5,000 population which can be mounted on a Ford truck for use through the summer with little cost, the price for the tank complete with only one coat of lead being only $200.

The tank has a capacity of 500 gallons of water, sufficient to sprinkle three city blocks. It has a 14-inch manhole, a 3-inch connection for filling, a 6-inch outlet connection and two sprinkler heads, which are operated with levers from the cab. The tank is elliptical and fitted with a

FIVE-HUNDRED-GALLON SPRINKLING TANK FITTED WITH SPRINKLER HEADS.

longitudinal and surge plate to enable it to withstand the strains of surging water. The tank is mounted with four U-bolts and can be put in position in a few minutes.

When the tank is not in use it can be replaced with an ash and rubbish body mounted in the same manner.

EVERSON FILTERS

The Everson Filter Company, manufacturers of water filters, claims as one of the principal advantages of these filters the non-clogging strainer valve which contains slots 1/50 of an inch wide, the combined area of which is said to be about ten times that of the outlet nozzle and the shape of which prevents clogging. Another feature of Everson filters is that they contain only pure machine-cut quartz crystals instead of the rounded sand used in some filters. The company manufactures pressure filters up to capacities of about 150 gallons a minute, calculating 3 gallons per square foot per minute. Filters are made of several types and sizes, down to the smallest faucet filters with a capacity of 2 or 3 gallons per 24 hours.

CHAUSSE OIL BURNER

The Chausse Oil Burner Company has just introduced an apparatus to be used in repairing asphalt streets which will aid in meeting the present and anticipated shortage of labor. These machines have been used for the past five years and this experience has led to improvements which it has shown to be desirable. The surface heaters are made in two sizes, one covering 2 square yards and the other 4 square yards. The former will work up to streetcar tracks without interfering with the passing of cars. Both machines are mounted on springs to prevent damage in transit and fold up to facilitate transportation. The cutting edges around the burner hood give clean, straight joints. It has been found possible to melt down old asphalt to a depth of 1 inch in from 4 to 5 minutes and 600 square yards to this depth in an 8-hour day. In Detroit one Chausse heater and two men did the work of four men chopping out and saved the 1 inch of asphalt and 1-1/8 inches of binder left in the pavement; while the cost was reduced from $1.22 by handwork to 90c a square yard. Among the improvements are more efficient burners, lifting apparatus and refined insulation.

The company manufactures a tool heater which is equipped with rubber tires, Timken bearings and steady rests and a new type of burner. The artillery wheels and roller bearings make possible more rapid and noiseless transportation and hauling the heater at any speed behind motor trucks, or the machines can readily be pushed by one man. These heaters will bring fourteen or fifteen cold tools to the proper temperature in fifteen minutes and provide space for heating three buckets of cement. The burners will generate a maximum temperature in five minutes so that it is not necessary to build up fires long in advance of the use of the machines. Sufficient kerosene or distillate is carried for two 8-hour days of continuous burning at maximum temperature.

OTTERSON AUTO-LOADER

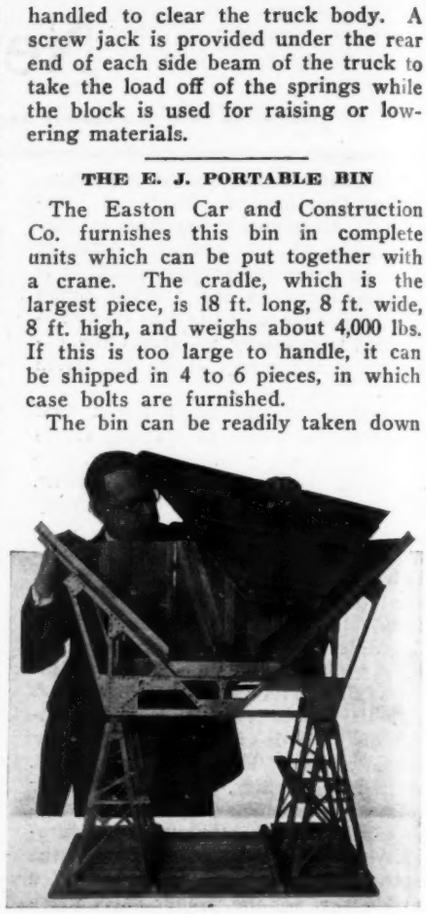
The Otterson Equipment Corporation has placed on the market a contrivance which can be installed on motor trucks of from 2½ tons to 7 tons capacity or on trailers of like capacity, for handling heavy articles of freight, loading them on to or unloading them from truck to platform, ground or excavations. These may include sewer and water pipes, heavy foundation stones, stone curbs, safes, barrels, oil drums, etc.; and it can be used to set telephone and trolley poles.

It consists essentially of a rectangular steel framework which is mounted on the truck and carries above the longitudinal axis of the truck a steel track on which runs a friction block. The track extends for any desired distance beyond the rear of the truck to permit the materials handled to clear the truck body. A screw jack is provided under the rear end of each side beam of the truck to take the load off of the springs while the block is used for raising or lowering materials.

THE E. J. PORTABLE BIN

The Easton Car and Construction Co. furnishes this bin in complete units which can be put together with a crane. The cradle, which is the largest piece, is 18 ft. long, 8 ft. wide, 8 ft. high, and weighs about 4,000 lbs. If this is too large to handle, it can be shipped in 4 to 6 pieces, in which case bolts are furnished.

The bin can be readily taken down



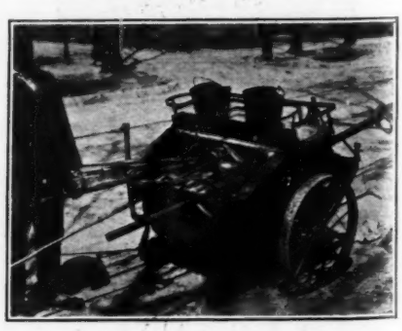
MODEL OF E. J. PORTABLE BIN

and transported by truck. It is strong, yet light, and of flexible construction. It can be provided with single or dual compartments, with either steel or wooden sides, ends, and partitions.

O'CONNELL MOTOR TRUCKS

The O'Connell Motor Truck Company manufactures a two-way drive super-truck especially designed for road building work which can be driven with equal facility in either direction, thus giving greater mobility and economy and eliminating the necessity for turntables, or the cutting up of the subgrade by turning around. In addition to the advantage of the two-way drive, it claims all the other advantages found in high-class motor

CHAUSSE SURFACE HEATER



CHAUSSE TOOL HEATER

Hamilton, "Corrosion of Hot Water Systems" by C. R. Texter, "The Removal of Dissolved Gases from Water" by J. R. McDermet, and "Zeolite Softening of Boiler Feed Water" by Sheppard T. Powell. On Friday before this section there will be a symposium on "The Application of Physico-Chemical Research to Plant," and one on "Purification Problems," J. W. Ellms presenting a paper entitled, "What Are the Problems?", A. M. Buswell one on "Theories of Coagulation," Frank Hannan a paper on "Micro-Forces, with Reference to Orientation and Curvature," William D. Hatfield a paper on "Soluble Aluminum in Filter Effluents," J. M. Baylis one on "The Use of Acids with Alum" and G. F. Catlett one on "Optimum Hydrogen-ion Concentration for Coagulation of Various Waters."

In the afternoon Robert Spurr Weston will discuss "The Use of Chlorine to Assist Coagulation"; Charles P. Hoover, "Mixing Devices and Re-action Time"; Paul Hansen will discuss "Thickeners"; Nicholas S. Hill, Jr., "The Recarbonation of Softened Waters"; Malcolm Pirnie, "Filter Unit Details," and William D. Hatfield, "Corrosion of Under Drains." The convention will close with these two sessions of Friday afternoon.

SERVICE DES EAUX

The third meeting of former A. E. F. water supply sanitary officers will be held in Detroit on May 24th in connection with the American Water Works Association convention. Ninety-four former officers are eligible for membership. Col. Bartow is commander-in-chief. There will be a dinner at 6 o'clock at the Army and Navy Club, which will be entirely informal, with no set speeches, but a general discussion on "Who Won the War?"

AMERICAN SOCIETY FOR TESTING MATERIALS

At the annual meeting, June 25th to 29, the first session, Monday evening, will be devoted to non-ferrous metals and alloys; during the two sessions Tuesday corrosion, fatigue of metals, magnetic analysis, wrought and cast iron, coal and coke, and heat treatment will be discussed. Wednesday's two sessions will be devoted to testing steel and the consistency and testing of glue. In four sessions on Thursday the subjects will be road materials, waterproofing, thermometers, timber, rubber, textiles, preservative coatings, cement, lime gypsum, ceramics and nomenclature. Friday morning, petroleum products, electrical insulating materials, slate and concrete will be discussed, and the evening will be given to a discussion on the properties of and methods of making concrete.

The nominating committee has announced as the regular nominees, Guilliaem Aertsen as president, W. H. Fulweiler as vice-president, and J. B. Chubb, T. G. Delbridge, H. L. Scott and P. H. Walker as members of the executive committee.

AMERICAN ASSOCIATION OF ENGINEERS

The ninth annual convention of this association was held in Norfolk, Va., May 7, 8 and 9. Monday was devoted to organization and to reports of officers and committees. Papers were read and discussed on Tuesday and on Wednesday committee reports and other business occupied the morning session.

The officers for the coming year are: President, Webster L. Benham of Kansas City, Mo.; first vice-president, G. M. Butler of Tucson, Ariz.; second vice-president, Morris Bien of Washington, D. C. The new directors of the several districts are: 1st, W. H. Marsh, Portland, Ore.; 2nd, Hubert C. Ferry, Los Angeles, Cal.; 4th, J. C. Nagle, Dallas, Tex.; 5th, J. E. Kaulfuss, Bismarck, N. D.; 6th, Dan W. Patter, Tulsa, Okla.; 7th, W. R. Harris, Chicago, Ill.; 10th, M. Z. Balph, Pittsburgh, Pa.; 12th, Philip Sellers, New Haven, Conn.

O'CONNELL MOTOR TRUCKS

(*Continued from page 24*)

trucks. It has five speeds, both backward and forward, giving a very low speed for heavy pulling. There are two seats, on opposite sides of the wheel, so that the driver is always facing in the direction of progress, and the pedals are not changed relative to his position whether facing forward or backward.

MECHANICAL HOIST FOR MOTOR TRUCKS

Borg & Beck furnish for motor trucks an underbody mechanical hoist which is claimed to involve an entirely new mechanical principle as applied to truck hoists. It utilizes the power of the truck engine in raising a heavily loaded body, the power being transmitted to a shaft set at right angles to the truck frame with an eccentric drum on each end. This drum winds up a steel cable, the other end of which is attached to the lower end of a pivoted curved steel arm. It is said to have sufficient power to raise the heaviest load carried by motor trucks. When the body has been raised to its highest elevation it is locked firmly in this position and the hoisting mechanism is thrown out of gear automatically.

THE FRUEHAUF TRAILER

The illustration shows a Fruehauf Trailer, model C-450-R. This trailer is of the reversible type, that is, it may be steered at either end. Another special feature is the elimination of the knuckle axle, in place of which there are used one-piece dead square axles with steering obtained through roller-bearing circles, this being the principle used in wagons and known as the "fifth wheel" type. Because of this construction, the makers guarantee these trailers against "snaking" or side-swaying during the life of the vehicle. This does away with all wearing parts incidental to steering knuckle axles. As either axle can be turned at right angles, it makes possible a shorter turning radius than with any other type. Either pair of wheels can be locked and the others unlocked, thus giving great flexibility. The locking device is fool proof and cannot slip.

A. P. C. DRYERS

The American Process Company manufactures direct-heat rotary dryers with either parallel or counter-current operation, and also steam-heated air dryers, cookers and digesters for liberating grease or oil from garbage, dead animals, sludge, etc. Also continuous screw presses for removing liquids from material which has been digested or otherwise treated. They also manufacture rendering tanks for use when the quantity of material to be handled is not sufficient to justify a continuous cooker or digester.

MEASURING HOPPERS AND BINS

The Butler Equipment Company manufactures steel measuring hoppers and bins for concrete aggregate, the bins being either stationary or portable. The hoppers are of heavy all-steel construction using 3/16-inch steel plate and a frame of 6-inch channel iron. They are adjustable to any mix between 10 and 28 cubic feet for stone and between 5 and 13½ cubic feet for sand, an indicator showing when the hopper is full, accurate struck measurements being given. It is claimed that with one set of hoppers one man can load a single-batch truck in 10 seconds and a three-batch truck in a minute.

The portable steel bin, which is given the name, "Measure the Mix," is all steel and can be moved intact in any direction. It will load 1, 2, 3 or 4 compartment trucks in one spotting. The capacity is 10 cubic yards of sand and 20 of stone. The height is 18 feet 6 inches and a 30-foot boom will clear it when working on a 21-foot radius. The hoppers described above are mounted under the bins.

The stationary steel bin is built in sections easily and quickly erected, a 12x12-inch base plate at the bottoms of each leg being anchored to a concrete or timber foundation. The bin and hopper arrangement is the same as for the portable bin and it can be converted into a portable at any time by removing the legs and substituting those of the portable outfit.

FRUEHAUF TRAILER WITH DUMP BODY

MOLINE ROAD TRACTOR

The Moline Plow Company manufactures a tractor combined with a 1-yard power-lift scraper and a scarifier, which are carried by the frame of the tractor, which is a 4-wheel unit working backward or forward like an auto and operated by one man.

It is especially adapted for rough construction, scarifying its own earth, for both rough and final finish of subgrade, for filling earth in washed shoulders and smoothing it with a spreading blade, and for other work such as stripping gravel beds, moving clay for brick works, etc.; the scraper being interchangeable with the grader. It is stated that it can back up a 40% grade and haul a large load down.

The scarifier has five high carbon steel teeth controlled from the operator's seat. The bucket is long and shallow with a capacity of 1 yard and dumps through a 35-inch opening like a clamshell. It is claimed that under reasonable conditions it will average a 300-foot haul in three minutes or a 100-foot haul in 1¼ minutes. A light spreading blade at the rear can be used to smooth the dirt dumped, also for bucking a dumped load over the edge of a steep embankment. It can work economically in moving small yardages where the operation of a large outfit would be costly.

In finishing a subgrade it will pull the subgrader, pick up the windrowed earth and deposit it on the shoulders, backing through an opening in the side forms. Two levers control raising, lowering, opening and closing of bucket.

The engine is 4-cylinder, rated 10 to 20 h. p. Gasoline is used as fuel. The drive wheels are 48 inches in diameter with 10-inch face. The tractor speed is up to 3 miles per hour. The weight of the tractor is 4,700 pounds. Forty saw-tooth lugs 3 inches high are provided for soft ground or flat lugs 1 inch high and wide for hard surfaces. The bucket has a 40-inch cutting edge, is 5 feet long and has a 16-inch clearance when lifted. The weight of either the scraper or the grader is 2,300 pounds.

INDUSTRIAL NOTES

WATERMAIN CLEANING

The National Watermain Cleaning Company has published a booklet giving the names of cities for which the company has cleaned watermains, together with the dates. Special attention is directed to the repeat orders as indicating satisfactoriness of service. For instance, Boston, for which the company first cleaned mains in 1913, has employed it on eleven other contracts since then. Charleston, S. C., has given five repeat contracts, Cincinnati, Ohio, 11; Newport, Ky., 5; St. Louis, Mo., 7., and at least a score of other cities given in the list have shown their satisfaction in similar manner.

McINTOSH & SEYMOUR OIL ENGINES

The McIntosh & Seymour Corporation manufactures an internal combustion engine of the 4-cycle Diesel type using liquid fuel, such as crude or fuel oil. The plant used by this company covers about 20 acres located on two railroads and equipped with tracks and overhead cranes for transportation of the various parts. The firm was founded in 1886 under the name of "McIntosh & Seymour" and began building stationary steam engines. In 1913 arrangements were made to build Diesel engines at the plant at Auburn, New York embodying certain mechanical features resulting from their long experience in American engine practice. Since then over 150,000 brake-horsepower of Diesel engines have been produced by this plant.

CONTINENTAL PIPE

The Continental Pipe Manufacturing Company has issued catalogue No. 18, devoted to Continental wire-wound wood pipe, Continental continuous-stave wood pipe, and creo-stave wood flume. The catalogue is profusely illustrated; contains descriptions of pipe, formulas, tables and other descriptions. 246 pages. 5½x8½.

P. & H. EXCAVATING EQUIPMENT

The Pawling & Harnischfeger Company has recently issued three new bulletins featuring its excavating equipment. Number 58-X features clamshell, dragline, orange peel, backfiller, crane hook, electro-magnet and pile driving rigging, with which its excavators may be equipped. The 16-X bulletin features the trenching machinery; while a testimonial bulletin is made up of letters from a few of the users of the company's machinery.

EVINRUDE CENTRIFUGAL PUMP.

A somewhat unusual use for a centrifugal pump is recorded by the Evinrude Motor Company. One of the large Canadian lumber companies is using an Evinrude pump for icing logging roads near Hudson Bay. The pump is swung down into a water hole and, when not operating, is lifted out and drained to prevent freezing. This is believed to be Evinrude's farthest north to date.

CHAUSSE OIL BURNER CO.

The Chausse Oil Burner Company has been incorporated in Michigan to manufacture oil-burning apparatus, house furnace burners and hand torches. The officers are: W. McK. White, president; W. G. Chausse, vice-president, and W. P. White, secretary. Offices have been opened at 206 Lincoln Building, Detroit. The Chausse Company has been manufacturing this apparatus in a small way for several years.

GYPSUM INDUSTRIES

The Gypsum Industries has moved its offices from 111 West Washington Street to the America Fore Building, 844 Rush Street, Chicago, where it will have enlarged office space. This is a service bureau maintained by gypsum producers, the work of which consists of research, promotion, advertising and preparing specifications for gypsum products. An engineering department is maintained for the benefit of the public. Authentic information on the proper use and application of gypsum in building construction is furnished and literature on the various uses of gypsum plasters will be sent free upon application.

WALKER VEHICLE COMPANY

This company, which manufactures balance drive electric trucks, has opened a branch office in the Atlanta Trust Building, Atlanta, Georgia. P. C. Pomeroy, who has had extensive experience in the business as representative of the White and Packard organizations, has been appointed district manager.

"PAVING BRICK NEWS."

The Eastern Paving Brick Manufacturers Association issues monthly a readable little pamphlet with the above title. No. 4, the April issue, discusses service cuts in brick pavements.

ASPHALT IN JOHANNESBURG

The Sunday Times of Johannesburg, South Africa, stated recently that Bermudez road asphalt was used about a year ago in laying 50,000 yards of pavement in that city and the town engineer is well pleased with the results so far, while the roads superintendent stated that he would like to see that type of street greatly extended. Tarred surfaces had been used previously but would not stand heavy traffic through a single wet season and the Bermudez asphalt costs only about 2½ times as much.

PORTLAND CEMENT BY THE SACK

Beginning June 1st, the Universal Portland Cement Company will sell and invoice cement by the sack instead of by the barrel. It reports that "this change is made only after sending an inquiry to thousands of cement buyers, including dealers, contractors, architects and engineers, large industrial concerns and others. The replies were overwhelmingly in favor of the change."

HEIL COMPANY'S BIRTHDAY

The Heil Company announces that May 1st was the twenty-second anniversary of the organization of the original company known as the "Heil Rail Joint Welding Company." In 1912 the company built the first steel dump body for the Sterling Motor Truck Company, and in 1917 built one-fourth of the steel-body equipments used by the War Department. In 1919 the company took over the Hydro Hoist Company, manufacturing hydraulic hoists for motor trucks. The five shops of the company now cover a floor space of 150,000 square feet and are fitted with up-to-date equipment of all kinds.

COMMITTEES OF WATER WORKS MANUFACTURERS ASSOCIATION

The Water Works Manufacturers Association has appointed committees for the Detroit convention of the American Water Works Association which will be held on May 21st to 25th. The committees are as follows:

Transportation — Chairman, Walter H. VanWinkle of the Water Works Equipment Company; T. C. Clifford, Pittsburgh Meter Company; Raymond Simon, R. D. Wood Company; Joseph Ivy, American Cast Iron Pipe Company; H. Brown, Neptune Meter Company; H. M. Lofton, Columbian Iron Works.

Entertainment Committee — Chairman, Burt Hodgman, National Water Main Cleaning Company; William Sherwood, Hersey Manufacturing Company; John H. Stutt, E. I. DuPont de Nemours Company; John F. Regan, Neptune Meter Company; George Smith, Michigan Valve & Foundry Company.

Exhibit Committee—Chairman, Geo. McKay, Jr., Leadite Company; J. D. Capron, U. S. Cast Iron Pipe & Foundry Company; C. C. Behney, Simplex Valve & Meter Company.

Golf Committee—Chairman, M. F. Tiernan, Wallace & Tiernan Company; Karl Mann, Fire & Water Engineering; E. Case, Pitometer Company; John Sosnowski, Board of Water Commissioners; R. W. Conrow, Central Foundry Company.

Press Committee—Chairman, Isaac Holbrook, Engineering News-Record.

NEWS OF THE SOCIETIES

CALENDAR

June 25th to 29th. AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

July 11-13—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual convention, Chicago.

Sept. 11-14—AMERICAN SOCIETY OF SANITARY ENGINEERS. Annual convention at Davenport, Ia.

Sept. 18-21—NEW ENGLAND WATER WORKS ASSOCIATION. Annual convention, Burlington, Vt.

Oct. 8-13—AMERICAN PUBLIC HEALTH ASSOCIATION. Fifty-second annual meeting, Boston, Mass. Secretary, A. W. Hedrich, New York City.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Memphis, Tenn. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov.—OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

Jan. 13-19—AMERICAN ROADBUILDERS' ASSOCIATION. The annual convention and National Good Roads Show, Chicago, Ill.

Feb. 25-28—AMERICAN CONCRETE INSTITUTE. Annual convention, Chicago. Secretary, Harvey Whipple, 1807 East Grand Boulevard, Detroit.

UNITED STATES GOOD ROADS ASSOCIATION

At the convention in Greenville, South Carolina, of the United States Good Roads Association and the Bankhead National Highway Association, Albuquerque, New Mexico, was chosen as the place of the meeting of the 1924 convention, that city having promised that it would secure 1,400 additional members for the associations before next year's convention.

AMERICAN ROADBUILDERS' ASSOCIATION

At the annual meeting held in New York, May 15th, announcement was made of the election of new officers and directors, selection made of the time and place of the next convention, and reports received from the Executive Committee, Convention Committee and Treasurer. The new officers are: President, Frank Page, chairman of the State Highway Commission, Raleigh, North Carolina; vice-presidents—northeastern district, E. L. Powers, New York City; southern district, W. S. Keller, Montgomery, Alabama; central district, S. F. Beatty, Chicago, Illinois; western district, Samuel Hill, Seattle, Washington; treasurer, James H. MacDonald, New Haven, Connecticut. The directors are: one year, J. R. Brenery, Frank T. Sheets and W. A. VanDuzer. For two years, C. M. Babcock, H. K. Bishop, H. S. Carpenter, J. H. Cranford, E. J. Mehren, I. W. Patterson and William R. Smith. For three years, Will P. Blair, R. Keith Compton, S. T. Henry, Fred A. Reimer, H. G. Shirley, Frank Terrace and Charles M. Upham.

Accompanying the report of the Convention Committee was a financial statement audited by certified public accountants showing that the receipts from the sale of exhibition space were $62,824.77 and the disbursements were $56,332.81, leaving a gross profit of $6,491.96.

Following the close of the annual meeting the new board of directors met and elected as secretary pro tem Ethel A. Birchland and as executive committee Thomas J. Wasser, S. T. Henry and William R. Smith, the president and treasurer being members ex-officio. It selected Chicago as the place for holding the next convention and the National Good Roads Show, and Januray 13th to 19th as the date.

The Highway Industries Exhibitors' Association submitted a proposition to conduct the next show in the name of the American Roadbuilders' Association and turn over to that association out of profits of the show a sum to cover its running expenses. This proposition was thoroughly discussed and unanimously rejected, the Roadbuilders' Association deciding to conduct the 1924 show, but seek the cooperation of the Highway Industries Exhibitors' Association, the executive committee being given authority to make detailed arrangements with the association.

MICHIGAN MANUFACTURERS' ASSOCIATION

In the election of its new officers this association has honored Clarence E. Bement, vice-president and general manager of the Novo Engine Company, by electing him president and H. J. Mallery, vice-president of the Buick Motor Company, by making him first vice-president, and Arthur T. Waterfall, vice-president of Dodge Brothers, Incorporated, as second vice-president.

AMERICAN SOCIETY OF CIVIL ENGINEERS

The ballots for nominees of this society for president, vice-presidents and directors were canvassed on June 1, with the result that Francis Lee Stuart and C. E. Grunsky were selected as official nominees for president, with 537 and 285 votes respectively out of a total of 1,339 ballots (from a total membership of about 10,000). The other nominees are: Vice-Presidents—Zone I, Lincoln Bush; Zone IV, George G. Anderson and Oscar S. Bowen. Directors—Dist. 1, Paul G. Brown and Thaddeus Merriman; Dist. 4, G. H. Blakeley, Robert Farnham and John Meigs; Dist. 11, Arthur D. Ridgway; Dist. 14, E. A. Hadley, Alexander Maitland, Jr., and C. F. Maitland; Dist. 15, J. M. Howe and J. H. Brillhart.

The above received more than 5 per cent of the votes in their respective districts. From 4½ to 35 per cent of the votes in the different districts went to others receiving less than 5 per cent each.

PERSONALS

Carlisle, Chas. C., has been appointed city engineer of Cheyenne, Wyo.

Atkinson, Chas. F., has been appointed division engineer with the Louisiana Highway Commission, with his office at Monroe.

Bonar, S. Howe, city engineer of Moundsville, W. Va., for several years, died recently.

Klein, R. A., on April 1 became state highway engineer of Oregon.

McFaul, W. L., formerly assistant city engineer of Hamilton, Ont., has been appointed city engineer, succeeding E. R. Gray, who on April 15 became manager of the Park Board of that city.

Tillotson, Luther R., has been appointed state highway engineer of Kansas.

Mandigo, Clark R., for several years chief engineer of the Western Paving Brick Mfrs. Ass'n., recently became chief engineer and secretary of the Kansas Ass'n. for Public Improvements, with his office at Kansas City.

Storrs, John W., of Concord, N. H., has been reappointed member of the State Public Service Commission.

Watson, M. W., state highway engineer of Kansas, tendered his resignation to become effective April 1st. He had occupied this position since July, 1918.

Hatt, Prof. W. K., director of the Advisory Board on Highway Research of the National Research Council, sailed for Europe on March 17th to study highway development in several countries and attend the International Road Congress at Seville in May.

Black, Walter G., has been appointed state engineer of North Dakota and chief engineer of the State Highway Commission.

Pancoast, A. C., has been appointed county engineer of Bexar County, Texas.

Percival, Fred M., formerly engineer at Rison, Arkansas, has been appointed engineer of San Patricio County, Texas.

Lorentz, Fred A., has been appointed chief engineer of the Board of Public Utilities of Los Angeles.

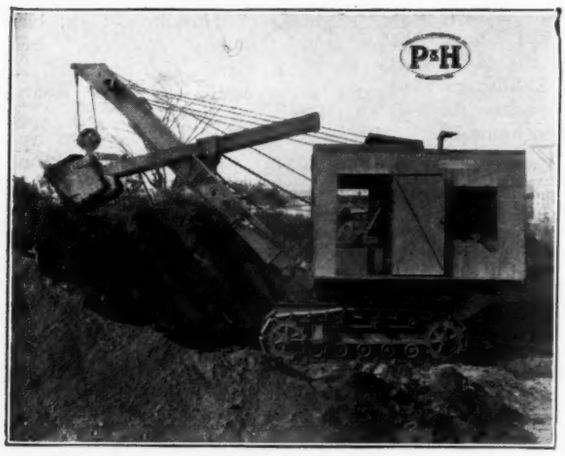
Bullock, William D., who had been employed by the city of Providence for more than fifty years, died on May 1st in his 74th year. He entered the City Engineering Department in February, 1873, and had been in that department ever since, his title being assistant engineer in charge of bridge and harbor work.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

NEW GASOLINE SHOVEL

The Pawling & Harnischfeger Company of Milwaukee, Wisconsin, has introduced a 1-yard shovel operated by either gas or electricity which is very similar in design to its ½-yard and ¾-yard machines. The gasoline or electric drive eliminates the necessity for firemen and providing fuel and water, the last of which, required by steam machines, is sometimes very costly. The machine is designed to come within standard railway clearances with only a small amount of dismantling. It



NEW SIZE P. & H. GASOLINE SHOVEL.

is mounted on the Pawling & Harnischfeger corduroy traction. The crowding motion is of the standard Pawling & Harnischfeger design which gives a positive motion regardless of the position of the dipper. A manganese rack on the dipper stick is driven by a heavy thimble roller chain from a set of planetary gears mounted on the forward drum of the machine. By a simple change of booms the machine may be used with dragline, clamshell, pile driver, crane hook, etc.

STEEL SUBGRADER

The Lakewood Engineering Company has recently brought out a steel subgrader, which is a development of the wood frame subgrader used for several years, in an effort to meet a demand for a heavier unit and one which could be equipped with scarifying teeth on the front member to assist in breaking up the subgrade ahead of the blades. The company will still furnish the wood frame subgrader, but offers this for contractors desiring a heavier and stronger machine.

The subgrader travels on the side forms and is pulled by a roller or tractor. Steel cutting blades, which can be adjusted so as to take very fine cuts, trim the subgrade to exactly the depth desired to give the proper thickness for the concrete slab or other surface material.

The machine will cut either a flat or a crowned subgrade and can be adapted for the new Illinois concrete standard section with its thicker edges. A turntable pedestal allows the machine to be raised off of the forms and turned in the middle of the road to allow a roller or trucks to pass.

A NEW EXPLOSIVE GELATIN

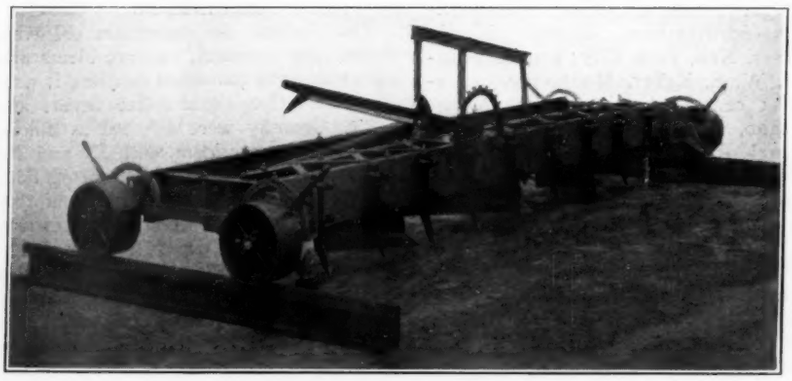
The Atlas Powder Company has recently placed on the market a new gelatin which is said to be both more efficient than the old as an explosive and also to evolve only a negligible amount of fumes One foreman reported that they have been able to eliminate three fans at the heading because gas from the gelatin does not bother the workmen at all. In another tunnel operation the resident engineer reported that the men could return to work in 10 to 12 minutes after blasting where before at least 30 minutes was required. The manufacturers also claim that the new gelatin is extremely high in water resistance and practically perfect in plasticity.

SENTRY TRAFFIC GUIDE.

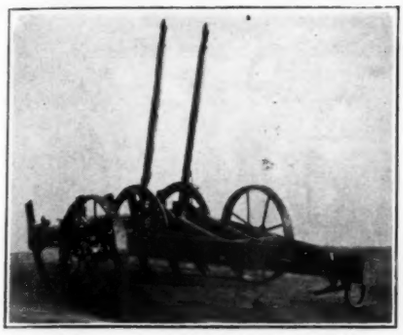
SENTRY TRAFFIC GUIDE

A low-set traffic guide is manufactured by the Safety Traffic Guide Company of Elkhart, Indiana, which is to be located at street intersections and which is built in two heights, either 5 inches or 3½ inches, the latter especially adapted for use between car-tracks. It is of semi-steel construction built for heavy traffic and guaranteed against breakage. The windows are 12 inches by 3 inches and carry the street names in prominent raised letters. Should the lamp burn out, it requires only a minute's time to put in a new globe. The light is delivered through heavy glass which is incased in rubber and mounted in a detachable metal frame that can be removed by turning two brass screws. The glass is recessed sufficiently from the surface so that passing vehicles cannot touch it. The base is set in concrete and a rubber gasket is placed between it and the top and a drain provided for carrying away water and moisture that might accumulate by sweating. The inside is finished in bright aluminum to serve as a reflector. There are no projections to damage a tire or wheel and the lines are graceful.

The company also manufactures parking signs, street and zone markers, semaphores, etc.



LAKEWOOD STEEL SUBGRADER.



LAKEWOOD GRADEROOTER.

THE GRADEROOTER

The Lakewood Engineering Company of Cleveland has this season brought out a new design of paving equipment which it calls "The Graderooter," and which has been found particularly useful in scarifying subgrade preliminary to mechanical subgrading. It is also adapted to practically all scarifying work required on the average road job and is heavily built to stand severe service. It is reported that some contractors are using it in place of a rooter plow. It is furnished with two sets of five teeth each and one special manganese tooth to be used alone for particularly heavy work. The machine weighs about 1,300 pounds and can be used with either tractor or team hitch.

UNLOADING TANK CARS

An all-metal hose, with couplings, is manufactured by the Pennsylvania Flexible Metallic Tubing Company for use in unloading oils and petroleum products from tank cars. The hose, being entirely of metal, does not under any conditions absorb refuse, oil or moisture. It is claimed that it never kinks or collapses but always maintains its full area; can be used in all climates and weather and always remains flexible. Various types of couplings are furnished, both male and female, with both 90-degree and 45-degree elbows. Hose and couplings are furnished in 2-inch, 2½-inch, 3-inch and 4-inch sizes.

ELECTRIC LOCOMOTIVE FOR SMALL TUNNELS

A combination trolley and storage battery locomotive is manufactured by the Atlas Car & Mfg. Company of Cleveland especially for use in small tunnels, such as that at Great Notch, New Jersey, described in this issue. This is known as the "Type C" locomotive and has been developed by the company with two principal points in mind—overall efficiency and economy. To secure the first, chain drive is employed, it being believed to be more efficient than any other type as well as being easily renewable and economical. The locomotive contains one power motor of sufficient power to slip the driving wheels and two short oversize chain drives to each axle, giving a 4-wheel drive with equal stress on both axles and wheels.

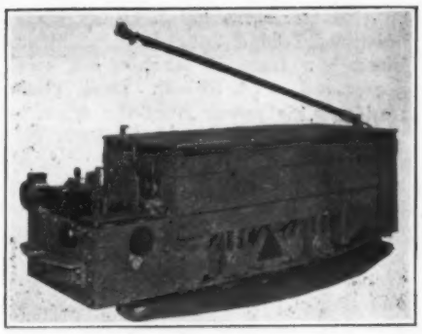
The combination of trolley and storage battery is of particular advantage on heavy grades. The trolley is used principally on dumps outside of the tunnel which, as a rule, have heavy grades, during which time the battery is cut off from service and can even be given a boosting charge while the trolley is in use.

The locomotives are manufactured as small as 2-ton size and are especially interesting to contractors and engineers engaged in tunnel work. All parts are carried in stock at the factory and deliveries can be made promptly.

THE HOAR BABY SHOVEL

The Hoar Shovel Company of Duluth manufactures a baby power shovel that performs in confined underground workings the kind of work done in the open by a large steam shovel. This shovel will work in tunnels only 7 feet high and 7 feet wide. The dipper capacities range from 4 to 12 cubic feet, according to the material handled. The machine can be carried on standard mine cages.

In general it consists of a dipper on the end of a dipper stick which stands vertical while crowding the dipper into the muck pile, but is swung into a horizontal position when the dipper is filled, when the entire machine can be swung on a horizontal turntable through any part of 180 degrees and the dipper dumped through a bottom door into a muck car either behind or alongside of it. The total height from top of rail to highest point when the dipper stick is horizontal is 6 feet, while in swinging from horizontal to vertical position the highest point reached by the dipper stick is 6 feet 6 inches. The operator sits in a seat at one side of the car and 3 feet above the rail and operates the car by means of three levers.



TROLLEY AND STORAGE-BATTERY LOCOMOTIVE.

The operation consists in dropping dipper into muck pile, crowding, hoisting and filling the dipper. Then racking dipper and carriage back over the machine to permit of swinging. Then swinging shovel 180 degrees. Then racking carriage and dipper over car and tripping the latch. Racking empty dipper and carriage back over machine preparatory to swinging back to muck pile. Then swinging back to pile and dropping dipper again.

The engines are operated by air, which should be supplied through a 1½-inch air line at pressures of 80 to 100 pounds. The maximum amount of air required is 300 cubic feet of free air per minute. The mechanism consists of a 4½-horsepower swinging engine, a 7-horsepower hoisting engine and a 7-horsepower crowding engine. The platform carrying these revolves

UNLOADING TANK CARS.

HOAR BABY SHOVEL IN TUNNEL.

on the truck on ball-bearings. The hoisting engine operates a drum through a train of machine-cut steel gears and a 9/16-inch steel chain transfers the power from the drum to the end of the dipper stick. The crowding engine drives a cable drum by means of worm gear which self locks the drum and prevents the carriage from backing up when crowding the dipper into the pile. The swinging engine is vertically mounted and swings the shovel through 360 degrees by means of intermediate gearing to the bull gear attached to the bottom ball race on the bed. No clutches are used but the engines are directly reversible by means of reversing throttles direct connected to the operating levers. It is claimed that this directly reversing feature at full speed gives the desired kick necessary in shovel operation and makes it faster than the regular steam shovel. All parts of the engine are made of the best material and rugged. The dipper sticks are heavy steel channels substantially cross braced. The dipper is a miniature steam shovel dipper with standard latch, and teeth which are either steam shovel teeth for coarse and bulky material, or a sawtooth lip for finer, looser material.

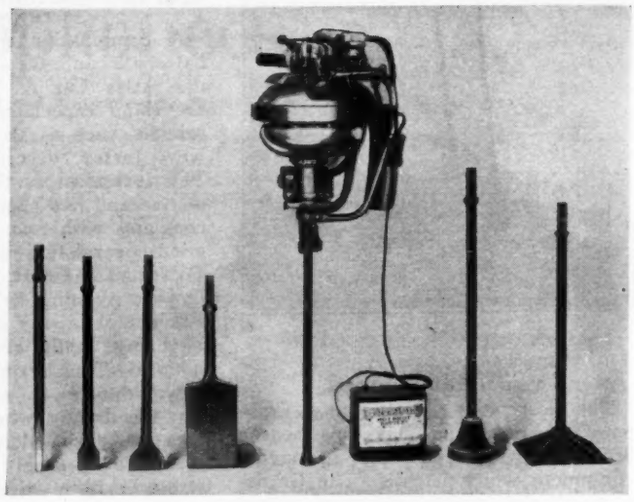
This shovel has a clean-up radius of 7 feet 6 inches to 7 feet 8 inches. It weighs 6,000 pounds. A somewhat larger shovel is made slightly wider, longer and higher, weighing 300 pounds more and with a clean-up radius of 8 feet to 8½ feet, and another is made considerably smaller, with a height of 5 feet 3 inches, length the same and with 2 feet 8 inches and a clean-up radius of about 7 feet; but these two are special sizes not carried in stock.

One user reported loading a ton of ore in from a little over a minute to 2½ minutes. The average speed when the shovel was digging was a ton in two minutes. He reported the operating cost of loading with the Hoar shovel as about half that of hand-labor.

LITHOPRINTS FOR PUBLIC DEPARTMENTS

Lithoprints are ink reproductions of drawings that can be made on any material at about the cost of blueprints. Prints used by city, county and state departments must generally be of a permanent nature, which prints made on sensitized paper are not, but the latter fade and crack with age and handling. City engineers can now prepare originals on tracing cloth and from these, lithoprints can be made on cloth or cloth-backed paper for all departments or services of the city. Additional information can be inserted in colored inks later if desired. The single set of master tracings can be kept up to date and lithoprints made from time to time to substitute for the out-of-date duplicates.

In the lithoprint process an etching is obtained on a composition plate through the use of a transfer print which is made in the same manner as a blueprint. The etched plate is inked with regular printer's ink and an impression taken off by hand onto any desired material, as in printing engravings. Any color ink, of course, can be used; no chemicals are applied to the paper, and the scale is true for the paper is not distorted by soaking in water or chemical. Prints of this kind are made by the Lithoprint Company of New York, Incorporated.



GASOLINE HAMMER DRILL WITH STREET OPENING TOOLS.

SELF-DUMPING STEEL BODY

A self-dumping steel body for Ford trucks is manufactured by the Wood Hydraulic Hoist & Body Company of Detroit. The body is constructed entirely of steel and, with its mounting frame, hinges and locking device, is a complete unit ready for placing on the truck frame. No holes need to be drilled in attaching the body. The body tilts on two hinged pins or fulcrums. The two fulcrum points have a definite effect to displace the center of the loaded body toward the rear while dumping, assuring quick action and obtaining a high dumping angle. When empty, the body is in a balanced condition and only a slight effort is required to return it to position, where it is locked against accidental operation caused by jolting of the truck. The body has a 3-point support which prevents twisting of the truck frame. The tail gate opens and closes automatically and the body can be dumped by a releasing handle which can be operated conveniently by the driver.

GASOLINE HAMMER DRILL

A gasoline impact drill of the air hammer type is manufactured by the Pennsylvania Gasoline Drill Company of Philadelphia. It is a self-contained portable gasoline hammer operated by one man. The hammer makes its own power and therefore no other equipment is required. It was first developed for drilling rock, but has been found to be of considerable advantage to city and state highway departments and to public utility companies for the

WOOD DUMPING MECHANISM.

WOOD SELF-DUMPING STEEL BODY.

opening of trenches in paved streets and for ramming the backfill and other purposes. The average weight of the drill, which is known as the Somervell Gas Drill, is 70 pounds and the daily consumption of gasoline is 1½ gallons. At 27c a gallon this gives the cost for gasoline at $3.91. The only additional cost is that of the one man needed to operate it and interest and depreciation on the purchase price which averages about $600.

The Philadelphia Electric Company tested the hammer for several weeks and found that it would do with one man as much work as 2½ men cutting asphalt surface, or 5 men breaking concrete base, or as 8 men ramming backfill.

For ramming backfill, a steel tamper with an 8½x8½-inch face was used. It is said that the backfill was so solidly compacted that, after placing a service conduit 4½ inches square in the ditch, all of the earth was replaced.

This drill combines the action of a drill hammer and the gasoline engine in such manner that the drilling unit has but two moving parts, the hammer piston and the flywheel assembly. No crankshaft or connecting rod is employed and there is no spring or other yielding member used in the internal construction. The air and gas passages are fixed ports cut through the solid cylinder. The down strokes of the hammer piston are made with approximately 900 pounds explosive force and the flywheel returns the hammer piston on the upward stroke. Approximately 1,800 impacts are struck per minute. The drill can be shifted to any desired angle while operating without affecting the operation. The flywheel runs in a river of oil and delivers abundant lubrication to all moving parts. A pint of oil suffices for a week's work. A four or six dry cell battery is used for ignition.

HALF-BAG TILTING MIXER

The T. L. Smith Company has recently placed on the market a half-bag tilting mixer, No. 375, which is easily portable and which is said to be the best made machine in the entire Smith line. It has the speedy discharge and continuous production found in the larger double-cone drums. The tilting lever locks in the discharge position and the drum returns automatically when the lever is released. The mixer weighs 1,100 pounds. The manufacturers mount it on two wheels equipped for Ford pneumatic tires to be transported rapidly as a trailer behind any automobile, or will mount it on four steel wheels with steel tires.

The mixer will hold a half-bag batch of 1:3:6 mix when aggregate contains 40 per cent. voids or over, and it is said an output of 50 cubic yards per day is possible.

INDUSTRIAL NOTES

FILM SHOWING CEMENT MANUFACTURE

A film showing the manufacture of cement, from blasting the limestone to storing the finished product, by photographs and animated drawings, will be loaned to interested organizations without charge by the Portland Cement Association. The film can be obtained from any office of the association.

SHOVELLING SNOW IN MAY

A representative of the Erie Steam Shovel Company telegraphed on May 15th that the Snoqualmie Pass, near Seattle, was cleared of snow and opened for traffic on that day. In opening the six miles of this pass through the Cascade Mountains an Erie shovel was used for fifteen days, this shovel having a special 4-cubic-yard snow dipper. About a foot of snow fell during the time that the shovel was at work. The work was done by Rumsey & Jordan of Seattle under contract with the State Highway Department. The caterpillar type of tractor on the shovel aided materially in speeding up the work.

EXHIBIT OF WATERWORKS MATERIALS

At the Detroit convention of the American Water Works Association, most of the firms furnishing materials for waterworks use exhibited these materials in rooms adjacent to the auditorium, and these exhibits excited general interest among waterworks men. The exhibitors were as follows:

The Leadite Co., Philadelphia; Rensselaer Valve Co., Troy, N. Y.; R. D. Wood & Co., Philadelphia; Payne Dean, Ltd., Stamford, Conn.; Chicago Bridge & Iron Co., Chicago; Neptune Meter Co., New York; U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J.; The American City, New York; Warren Foundry & Pipe Co., New York; Gamon Meter Co., Newark, N. J.; Water Works Equipment Co., New York; Public Works, New York; Thomson Meter Co., Brooklyn; Electro Bleaching Gas Co., New York; National Tube Co., Pittsburgh; Pittsburgh Meter Co., East Pittsburgh, Pa.; Builders' Iron Foundry, Providence, R. I.; Ross Valve Mfg. Co., Inc., Troy; Eddy Valve Co., Waterford, N. Y.; National Water Main Cleaning Co., New York; The Mathieson Alkali Works, Inc., New York; The A. P. Smith Mfg. Co., East Orange, N. J.; Wallace & Tiernan Co., Inc., Newark, N. J.; Hays Manufacturing Co., Erie, Pa.; Ford Meter Box Co., Wabash, Ind.; United Brass Mfg. Co., Cleveland; Lock Joint Pipe Co., Ampere, N. J.; National Meter Co., New York; Worthington Pump & Machinery Corp., New York; Engineering & Contracting, Chicago; Union Water Meter Co., Worcester, Mass.; Hersey Mfg. Co., South Boston; S. R. Dresser Mfg. Co., Bradford, Pa.; Lead Lined Iron Pipe Co., Wakefield, Mass.; Birch Mfg. Co., Chicago; Canadian Engineer, Toronto, Ont.; Engineering News-Record, New York; The Kennedy Valve Mfg. Co., Elmira, N. Y.; American Cast Iron Pipe Co., Birmingham, Ala.; H. Mueller Mfg. Co., Decatur, Ill.; W. & L. E. Gurley, Troy, N. Y.; The Central Foundry Co., New York; The Pitometer Co., New York; W. P. Taylor Co., Buffalo, N. Y.; The N. Y. Continental Jewell Filtration Co., Nutley, N. J.; Pittsburgh-Des Moines Steel Co., New York; Buffalo Meter Co., Buffalo, N. Y.; H. W. Clark Co., Mattoon, Ill.; Fire & Water Engineering, New York; Simplex Valve & Meter Co., Philadelphia; Roberts Filter Mfg. Co., Darby, Pa.; Pittsburgh Testing Laboratory, Pittsburgh, Pa.; Columbian Iron Works, Chattanooga, Tenn.; Layne & Bowler Co., Chicago; Volkhardt Co., Inc., Stapleton, N. Y.; Badger Meter Mfg. Co., Milwaukee; Sullivan Machinery Co., Chicago; McWane Cast Iron Pipe Co., Birmingham, Ala.; Glauber Brass Mfg. Co., Cleveland, Ohio; Elliott-Fisher Co., New York; Edward E. Johnson, Inc., St. Paul, Minn.; Pennsylvania Salt Mfg. Co., Philadelphia, Pa.; Federal Meter Co., Inc., Brooklyn; Electrolytic Chlorine Co., Kansas City, Mo.; East Jersey Pipe Co., Paterson, N. J.

FIRE FIGHTING WITH AN EVINRUDE

The Duluth daily papers recently reported that the little town of Central Lakes, Minnesota, with 150 inhabitants, used an Evinrude pump to save itself from destruction by forest fires. The fire was moving toward the main section of the village when this pump was brought three miles by two national guardsmen, lowered into a cistern under the parlor floor of one of the residences and from there discharged a stream which, aided by a bucket brigade, succeeded in halting the fire.

TRENCHING MACHINES

Trenching machines of both wheel type, for depths up to 7½ feet and 28 inches wide, and of the ladder type for depths up to 40 feet and widths up to 48 inches are offered for immediate delivery (subject to prior sale) by the Pawling & Harnischfeger Company of Milwaukee; also back-fillers and power tampers. The company recommends that contractors wire for details or for machines "as there will be a shortage of this class of equipment at the height of the season."

NEWS OF THE SOCIETIES

CALENDAR

Aug. 14th-16th—LEAGUE OF IOWA MUNICIPALITIES. Annual convention at Ottumwa, Iowa. Secretary, Frank G. Pierce, Marshalltown, Ia.

Aug. 20th — 23rd—ASSOCIATION OF AMERICAN CEMETERY SUPERINTENDENTS. Annual convention at Harrisburg, Pa. Secretary, W. B. Jones, Pittsburgh, Pa.

Aug. 30th—Sept. 1st—UNION OF CANADIAN MUNICIPALITIES. Annual convention at Shawinigan Falls, Quebec. Secretary, A. D. Shipley, 10 St. John St., Montreal, Que.

Sept. 10th—14th—LEAGUE OF CALIFORNIA MUNICIPALITIES. Annual convention at Coronado, Calif. Secretary, Wm. J. Locke, Pacific Bldg., San Francisco.

Sept. 10th—15th—AMERICAN INSTITUTE OF PARK EXECUTIVES. Annual convention at Kansas City, Mo. Secretary, Will O. Doolittle, Minot, N. D.

Sept. 11-14—AMERICAN SOCIETY OF SANITARY ENGINEERS. Annual convention at Davenport, Ia.

Sept. 18th—21st — NEW ENGLAND WATERWORKS ASSOCIATION. Annual convention at Burlington. Vt. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston.

Sept. 25th—28th—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention at Reading, Pa. Secretary, Clarence R. George, Houston, Tex.

Oct. 8-13—AMERICAN PUBLIC HEALTH ASSOCIATION. Fifty-second annual meeting, Boston, Mass. Secretary, A. W. Hedrich, New York City.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Atlanta, Ga. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. 13th—15th—CITY MANAGERS ASSOCIATION. Annual convention at Washington, D. C. Secretary, John G. Stutz, Lawrence, Kans.

Nov. 15-17—NATIONAL MUNICIPAL LEAGUE. Twenty-ninth annual meeting, New Willard Hotel, Washington, D. C.

Nov.—OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

Jan. 13-19—AMERICAN ROAD-BUILDERS' ASSOCIATION. The annual convention and National Good Roads Show, Chicago, Ill.

Feb. 25-28—AMERICAN CONCRETE INSTITUTE. Annual convention, Chicago. Secretary, Harvey Whipple, 1807 East Grand Boulevard, Detroit.

SOUTHWEST WATERWORKS ASSOCIATION

The twelfth annual convention of the Southwest Waterworks Association was held in Wichita Falls, Texas, on June 18th to 21st. Delegates were present from the states of Louisiana, Texas, New Mexico, Oklahoma, Missouri, Kansas, Arkansas and Nebraska, there being a total of about 300 present. The president of the association, Joe Patterson of Oklahoma City, came to Wichita Falls by aeroplane as a washout interfered with railroad travel.

At the morning session on June 18th, following the president's address, the secretary presented the financial report and a round table discussion was held on the subject of "Treating Water With Chlorine." In the afternoon J. W. Kelly of Las Vegas read a paper on "Private Ownership of Water Companies," while W. A. Stanfield of Topeka, Kansas, followed with one on "The Advantages of Municipal Ownership." R. O. Grant of Wichita Falls then spoke on "Modern Waterworks Accounting." In the evening J. A. Kemp described the irrigation project which he is carrying out, C. C. McDonnell spoke on "Is the Waterworks Manager a Human Being?" and C. E. Calder on "The Public Utilities and the Community."

The 19th was occupied by a trip over the new irrigation system of Wichita Falls. On the morning of the 20th Mr. Stanfield read a paper by Thomas L. Amiss of Shreveport on "Taking the Operation of Waterworks Out of Politics," and E. H. Ehlers, state sanitary engineer of Texas, gave an illustrated lecture on the "Maintenance of Sanitary Conditions of Water Supply."

In the election of officers in the afternoon, F. M. Larkin was elected president, F. W. Anderson of Tulsa, Oklahoma, vice-president, and R. D. Morgan, city engineer of Mexia, was re-elected secretary and treasurer. Also a governor was elected for each of the several states in the district—J. W. Hockaday for Texas, F. W. Anderson for Oklahoma, B. F. Ulrich for Kansas, Joe W. Kelly for New Mexico, W. M. Fowler for Louisiana, W. H. Gallagher for Missouri and H. J. Foster for Arkansas.

On Thursday W. H. Mahlie read a paper on "Algae and Its Treatment," N. G. Tyler one on "Tests for Overdose of Alum and Chlorine," and S. L. Williams on "New Methods of Water Service Distribution."

Topeka, Kansas, was selected as the place for the next convention.

BOSTON AFFILIATED TECHNICAL SOCIETIES

The Affiliated Council held its annual meeting on June 4th. The treasurer and executive secretary presented their reports, and officers for the following year were elected: Allen Hubbard as chairman; Alexander Macomber as first vice-chairman; Frederick M. Gibson as second vice-chairman; Charles L. Hammond as treasurer; Frank A. Marston as clerk and J. B. Babcock as executive secretary.

NEW ENGLAND WATERWORKS ASSOCIATION

The Nominating Committee of the New England Waterworks Association has presented the following names as official candidates to be voted upon for the year beginning next September, the ballots to be counted at the annual convention on September 18th:

For president: David A. Heffernan, superintendent of waterworks, Milton, Massachusetts; for vice-president, two years, Theodore L. Bristol, president Ansonia Water Company, Ansonia, Connecticut; vice-president for one year, Stephen A. Taylor, superintendent of waterworks, New Bedford, Massachusetts; directors, two years, Arthur E. Blackmer, superintendent of waterworks, Plymouth, Massachusetts and George A. Carpenter, city engineer of Pawtucket, Rhode Island; directors, one year, George W. Batchelder, water commissioner of Worcester, Massachusetts, and Frank Emerson, city engineer of Peabody, Massachusetts; treasurer, Frederick I. Winslow, consulting engineer of Framingham, Massachusetts.

ASSOCIATED GENERAL CONTRACTORS

Col. D. H. Sawyer has been appointed secretary of the Associated General Contractors of America to fill the place of Eugene Young, who recently resigned to enter business in Minneapolis. Colonel Sawyer graduated from the University of Illinois and is a member of the American Society of Civil Engineers. He has been city engineer of Paris, Illinois, chief engineer of the Illinois Traction System and was consulting and designing engineer from 1908 to 1917 when he entered the Quartermaster Corps. During the latter part of the War he was engaged in building a nitrate plant near Cincinnati.

STATE SANITARY ENGINEERS' CONFERENCE

The annual conference held by state sanitary engineers with the Public Health Service in Washington on May 16th and 17th of this year devoted its attention largely to the discussion of water purification.

A committee had been appointed to report on a new water standard to take the place of the Treasury water standard, which has been applied to railroads and other common carriers for several years past and has been adopted by a number of cities, although not intended for that purpose. Three sub-committees had been appointed—bacterial, field survey, and chemical, but only the first presented an official report. This report, by Abel Wolman, recommended using B. Coli as the only index organism, paying no attention to detail bacterial count. The report recommended 10 C.C. as the standard portion, five such portions to a standard sample, and that not more than 10% of all the 10 C.C. portions should show B. Coli. If about 100 portions of water are examined, the 10% limit would imply a probable density of about 1 B. Coli per 100 C.C.,

although some of the portions might run to 3 or even 10 per 100 C.C. This report was endorsed by the conference.

Mr. Wolman also reported for the Committee on Limitation and Control of Water Chlorination, in which the limit of 50 parts per 1,000,000 of turbidity was the only specific limit to chlorination without other treatment, information apparently being unavailable for fixing limits of either bacterial load or organic content. The committee urged that the chlorinating equipment be installed in duplicate. It believed that success of chlorination depended more upon the human element than upon the equipment. E. S. Tisdale of West Virginia said that in that state men in charge of chlorinating plants are provided with turbidimeters and color standards, and of the 61 chlorinating plants in that state the majority are in charge of Grade A operators and have duplicate spare parts and many of them duplicate equipment.

In a discussion of the collecting and shipping of water samples for analyses, there was some difference of opinion as to whether samples should be obtained by local health officers, or only by technically trained persons. Many felt that a better container for shipping samples was needed.

Mr. Jewell of Kansas spoke of the recent tendency to lessen expenditures for operating sewage works, thus throwing more burden upon the water purification plant, and the same thing had been noted in Pennsylvania by W. L. Stevenson. F. H. Waring spoke of the studies being carried on by the Ohio State and Federal Governments concerning loading of Ohio water filtration plants.

Among other subjects discussed were: Water shed control, statistical records of expenditures and results in reducing communicable diseases, well water supplies and the necessity for chlorinating them, and deep wells and the importance of sealing the bottom of the casing to the rocky strata.

Chiefs of sanitary engineering divisions of about half the states were present and three representatives of the Public Health Service. The conference voted (subject to approval by latter ballot) to admit assistant state sanitary engineers as associate members; also to restrict attendance at the conferences to the members, except on invitation by the executive committee.

The officers chosen for 1923-24 are: W. H. Dittoe, chairman; H. F. Ferguson, vice-chairman; H. E. Miller, secretary.

WESTERN SOCIETY OF ENGINEERS

The fifty-third annual meeting of the Western Society of Engineers was held in Chicago on June 18. Chas. A. Morse, the incoming president, in an address urged the members to take a more active part in public affairs; and E. Hill Leith discussed the close relation between the engineer and the banker. J. L. Hecht, the retiring president, called attention to the opportunities and responsibilities of the engineer in the development of greater Chicago. He stated that last year's deficit of $1,574 had been changed to a balance of $828. The membership, he stated, is now 1,997.

The Washington Award was presented to Capt. Robert W. Hunt because of his life's work in the steel industry, his aid to engineering societies, his engineering skill and personal attainments and character.

The officers for the coming year were announced as: President, Charles A. Morse; vice-presidents, E. T. Howson, Horace Carpenter, and H. H. Clark; treasurer, Geo. W. Hand; secretary, Edgar S. Nethercut.

AMERICAN CONCRETE INSTITUTE

The 20th annual convention of the Institute will be held in Chicago on February 26 to 28, 1924. The field to be covered by the meeting will be extended to include a sectional meeting plan for manufacturers, building superintendents, reinforced concrete designers, and others. Past President Henry C. Turner is chairman of the Special Convention Program Committee, which will have charge of arrangements for certain special features.

The Board of Direction has decided that there shall be an exhibit of specimen concrete, to include finished products, models, drawings and photographs to visualize the progress of the past 20 years. There will be no commercial exhibits as such and no exhibit space for sale.

PERSONALS

Duvall, Charles G., chief inspector in the engineering department of Indianapolis, is expecting to leave to become superintendent of construction for the Union Asphalt Paving Company.

Raynor, E. G., formerly with the State Highway Departments of New York and Iowa and assistant division engineer of the Nebraska State Department of Public Works, has been appointed highway engineer in the Bureau of Public Roads with headquarters at Pierre, S. D.

Congdon, C. C., has succeeded E. C. Blake as city engineer of LaCross, Wisconsin.

Kerscher, O. B., recently with the U. S. Bureau of Public Roads at Fort Worth, has been appointed engineer of the Indiana State Highway Commission for the Fort Wayne district.

Bedford, Thomas A., formerly division engineer of the California State Highway Commission at Dunsmuir, has succeeded F. G. Somner as division engineer at Willetts. He is succeeded at Dunsmuir by H. S. Comly, formerly assistant division engineer at that station.

Price, C. F., formerly engineer with the California State Highway Commission, has been appointed city manager of San Mateo, California.

Purcell, Stewart, assumed his duties as chief engineer of Baltimore, Md., on July 1st, succeeding A. E. Christhilf.

Hall, Julius R., formerly principal assistant engineer of the Sanitary District of Chicago, has opened an office as designing and consulting engineer at 115 So. Dearborn street, Chicago.

Orr, C. L., on May 1st succeeded C. E. Rice, resigned, as city engineer of Wooster, O.

Rhodes, F. A., has been reappointed city manager of San Diego, Cal.

Davis, J. P., has resigned his position as city engineer of Logansport, Ind., to accept a position with the Bowyer Construction Co.

BOOK REVIEW

CITY PAVEMENTS, by F. S. Besson, Major, Corps of Engineers, U. S. Army; Assistant Engineer Commissioner, District of Columbia. 42 pages. $5.00.

Major Besson states that his original intention was not the publication of a book, but personal study of the subject and collection of such information as would find practical application in handling highway work in the modern city. The ground which he covers is indicated by the division of the subject into five parts: "Administration and Management," "Planning and Design," "Concrete," "Bituminous Paving" and "Block Surfaces, Stone Curbs and Trees." Thirty-two pages are devoted to the first part, 106 to Planning and Design, 128 to Concrete, 95 to Bituminous Paving, 9 to Stone Block and Curbs, 12 to Paving Brick, 12 to Wood Block and two to Asphalt Block. The large proportionate amount of space devoted to concrete is explained to a considerable extent by the fact that the part on concrete includes concrete in general—the base for bituminous pavement and concrete sidewalks as well as concrete pavements. A considerable part of this matter was published in the February and March issues of Public Works.

The work is well illustrated and the illustrations are selected with much judgment for the information they convey rather than merely decorative purposes. The book has just been published and is up-to-date in both its theoretical considerations and the use of mechanical appliances.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

THE GRAY GIANT

This machine, manufactured by the Gray Tractor Company, Inc., of Minneapolis, utilizes the Gray wide-drum drive that is an exclusive feature of this company's product, the drum acting as the drive wheel when used as a tractor, and also as a roller. Immediately behind the drum is mounted a set of powerful scarifier teeth, which will tear up a macadam, gravel or other similar road to a depth of 3 inches, the tractor engine being one of 50 h.p. Behind the scarifier is a blade grader of heavy, stout design operated by a separate driver, the driver of the tractor also operating the scarifier and thus saving the wages of one man.

When the road has been sufficiently loosened up and surfaced, the scarifier can be raised, the grader detached, and the tractor operated as a road roller. For this purpose the Gray Giant tractor is made especially heavy, the total weight being 8 tons, of which approximately 6 tons comes upon the road through the drum, which itself weighs approximately 4 tons.

The scarifier carries seven removable teeth in a width of 72" and the grader has a 7' 3" blade. The entire equipment is 25 feet long and can be turned in a highway of ordinary width or at a street intersection. All parts of the machine are sufficiently stout for any conceivable use, except that a few bolts used in attaching the scarifier will give way, in order to avoid damage to the rest of the equipment, in case the scarifier teeth should catch upon a manhole head, piece of ledge rock or other immovable object.

The speeds are 2.94 miles and 2.27 miles per hour forward and 2.27 miles reverse. The roller or drum has a diameter of 54" and a face width of 54". Timkin roller bearings are used.

The manufacturers claim that this machine has restored to good condition, with proper contour, from six to twelve blocks per day of badly rutted street full of pot holes—a rate of performance much greater than is practicable with other equipments used for similar work.

In resurfacing a roadway, it is very desirable that the rolling be proceeded with immediately after scarifying, before traffic has had an opportunity to disturb the graded surface, and immediate rolling is one of the features of Gray Giant resurfacing.

GRAVEL HEATER AND DRYER

The Littleford Gravel Heater and Dryer No. 74 is manufactured by Littleford Bros., of Cincinnati, under the C. A. Mullen patent, and makes use of a very simple principle, whereby the combined power of heat and ventilation make drying and heating very rapid and thorough. It will heat all kinds of crushed stone and gravel, but cannot be used for sand. It is indispensible for winter concreting when large quantities of hot materials are needed.

It is made entirely of plate steel and consists of a large fire chamber with sloping walls of perforated steel extending upward to a point at the base of the charging hopper. At different levels but uniformly spaced from these walls are additional perforated walls or flights.

In operation, the material to be dried is loaded into the hopper at the top, from which it feeds by gravity into the open flights on both sides of heater. Here it is suspended in a thin layer against the perforated sides of the fire chamber and the heat passes directly to and through it, carrying away every particle of moisture. Hot, dry material continually feeds to the base, where it can easily be removed.

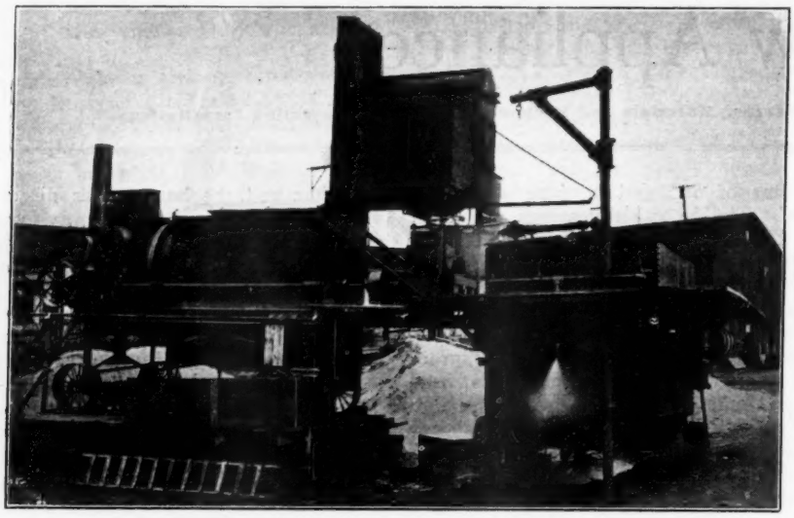
This equipment is mounted on heavy steel wheels and axles which are machine turned and fitted with standard axle nuts. A suitable handle is provided for drawing it about. It is made in two sizes which have heating capacities of two and four tons per hour. The lengths of the two sizes are 54 and 72 inches, respectively, the heights the same, and the widths 46 and 54 inches. The weight of the smaller is 1,600 pounds and of the larger 2,000 pounds.

PORTABLE ROAD ASPHALT PLANT.

A portable road asphalt plant is furnished by the Pennsylvania Road Machinery Company of Connellsville, Pennsylvania, in three different sizes—a 1,000 yard, 1,500 yard and 2,000 yard plant. Certain features which it is claimed are found only in these plants are: (1) The intake of the cold sand elevator is protected from the weather by means of a hooded cover, which prevents rain or snow from entering the drum. (2) The drum tire rides on two double-flanged rollers with adjustable bronze-bushed bearings, which prevents the drum from working either backward or forward. (3) The screen is so arranged that any section may be removed in a few minutes without removing screen from plant. (4) The mixer dump gates are operated by a cylinder which can be driven by compressed air or steam. (5) The dryer casing is thoroughly protected from the weather by means of sheet iron roofing. (6) The mixer teeth are made of high carbon

THE GRAY GIANT ROAD MACHINE

LITTLEFORD GRAVEL HEATER AND DRYER



"PENNSYLVANIA" 1,000-YARD ASPHALT PLANT

steel, which insures approximately 50% longer life. (7) Steam jackets in addition to being electrically welded are secured by stay bolts. (8) A steam cleaning system is provided by which both mixer and trucks can be thoroughly cleaned after the day's run, leaving everything in perfect shape for the morning start.

The one-car plant has a guaranteed capacity of 1,500 square yards of two-inch top or its equivalent for a 10-hour day. The car is specially built and extremely rigid. It has an all-steel underbody and is equipped with air brakes and every safety appliance, conforming strictly to M. C. B. and A. R. A. requirements. The kettle, casing, power plant, etc., are all riveted to the car. When the plant is in operation the mixer, of 12 cubic foot capacity, extends over the side of the car in such a manner that trucks may be backed under it for loading. The boots, as in all plants of this company, are equipped with quick dumping hinged doors in place of sliding gates, which invariably require the use of a sledge to open them, with a loss of time and frequent chain breakage. The only erection work to be done when the car arrives at its destination is to slide the mixer platform outboard and erect the sand bin. The upper section of the hot material elevator is hinged to the lower section in such a manner that when lowered it lies within the car. All other parts, being integral with the car, require no setting up further than hoisting the smoke stacks on the boiler and fan and anchoring the cold material foot shaft. Then, as soon as the boiler has been filled and fired, steam can be turned into the kettle coils and the heating of asphalt begun.

The sand drum for the 1,500 yard plant is 14' 3" long and 54" diameter, while that for the 2,000 yard plant is 17' 3" long and 60" diameter, both being of the revolving type, direct geared. For both sizes the mixer has a capacity of 12 cubic feet. The sand bin for the smaller has a capacity of 15 tons and for the larger 18 tons, each having a rotary screen. Each plant has a measing box on a 5-beam scale. The smaller plant has a 50 h.p. locomotive type boiler and the larger plant a 75 h.p., while the former has a 35 h.p. engine and the larger a 45 h.p. The smaller plant has two portable melting kettles each of 12 tons capacity and the larger plant has three such kettles; these being adapted for either fire melting or steam melting. The fire box is adapted to either coal or oil fuel. Draft is obtained by means of a belt-driven exhaust fan. The front end of the drum is carried on a heavy steel tire, which revolves on two adjustable flanged steel rollers with bronze-bushed bearings. The rear drum bearing is so designed that it may be used with or without water cooling.

The hot material bin is made of heavy steel plates with stiffening angles and divided into compartments for various sizes of materials and has a tailing spout to discharge all over-size material. The plants are designed to make Topeka mixture, bituminous concrete, Willite or Warrenite, without any changes.

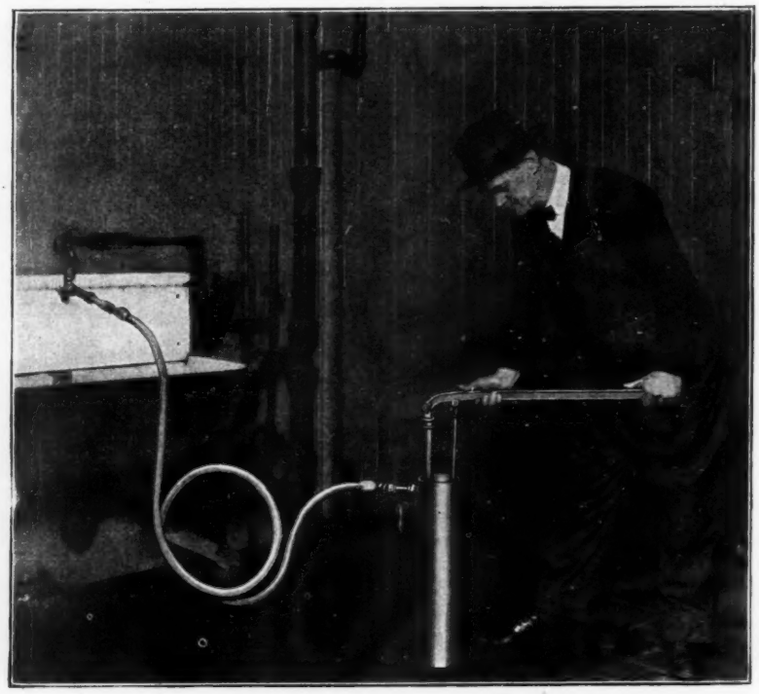
The mixer is of the pug mill type, steam jacketed and electric welded, and is driven directly from the power shaft by means of steel clutch gear, bronze bushed.

The asphalt kettles are made of ⅜-inch steel plates riveted and calked. Those for fire melting are furnished with fire-brick-lined fire boxes, while those for steam melting have coils of extra heavy pipe and convenient clean-out doors.

All gears are guarded to meet the requirements of the state laws for safety. When desired, a lime dust elevator is provided. An asphalt air lift also is provided, which is practically the same as used by all standard asphalt plants.

WATER MAIN FORCE PUMP

The Lawless force pump, manufactured by the Newark Brass Works of Newark, New Jersey, is described by them as a "19-pound pump with a 500-pound push." It is encased in a cylinder 4¾-inches diameter and the height is 28¾ inches. It is a hand-operated pump and is used for removing obstructions from service connections, the pump being connected to a faucet on the stopped-up service. It is also used for testing tees, traps, sprinkler installations, fire hose, etc.



LAWLESS FORCE PUMP IN USE

INDUSTRIAL NOTES

"CATERPILLAR" SERVICE SCHOOL

The Holt Manufacturing Company has begun giving instruction in the operation of caterpillar tractors manufactured by it, in schools established at various points throughout the country. The schools are carried on under the personal supervision of H. H. Chambers, service manager of the company, with three assistants. At these schools complete tractors, cut-away assemblies, including engines, clutches, transmission, roller frame assemblies, etc., are used, so prepared that the student can closely follow the lecture and, in the shop work which follows every lecture, can more readily carry on the work assigned him of disassembly and reassembly. In addition to personal instruction, instruction books are furnished every user and a continuous follow-up of service bulletins and letters of advice.

U. S. CASTIRON PIPE AND FOUNDRY COMPANY

This company announces that on July 1st D. B. Stokes, formerly western sales manager of the company, became general sales manager with offices in the Morris Building, Philadelphia. He is succeeded by W. G. Savage, formerly eastern sales manager, whose office is in the Peoples Gas Building, Chicago.

CONCRETE DATA FOR ENGINEERS

The Portland Cement Association has published a pamphlet entitled "Concrete Data for Engineers and Architects," in which it presents a few of the more important essentials to making good concrete. The principles set forth are based on data compiled from tests made at the Structural Materials Research Laboratory under direction of Professor Abrams. The pamphlet is well illustrated and contains in condensed form practical information easily understood under the heads: "Avoid Excess Mixing Water," "How to Make Watertight Concrete," "How Grading of Aggregates Affects the Strength of Concrete," "Colorimetric Test for Sands," "Rich Mixtures Make Stronger Concrete," "Thorough Mixing Increases Strength of Concrete" and "Proper Curing Increases Strength of Concrete." The pamphlet includes sixteen pages, 8½x11. Copies can be obtained at district offices of the association, which are located in all the largest cities of the country.

LINK BELT COMPANY

The Link Belt Company of Chicago and Philadelphia announces that L. M. Dalton has succeeded E. J. Burnell as manager of the Boston office, Mr. Burnell having resigned to enter business for himself. Also that the Cleveland office of the company has been changed from Room 429 to Room 329 in the Rockefeller Building.

NEW YORK BUYS OIL TRUCKS

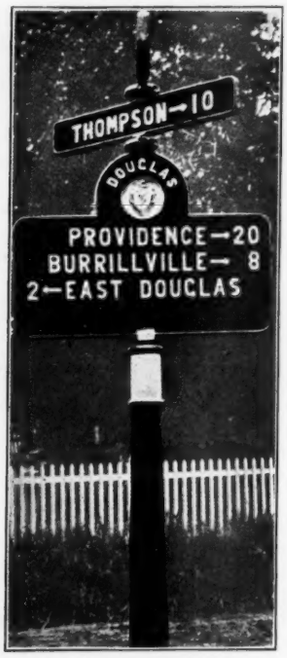
New York City's Fire Department has recently purchased three gasoline and oil supply tank trucks consisting of 900-gallon tanks divided into three 300-gallon compartments, and four 5-gallon cans, six 5-gallon safety cans and four 3-gallon oil cans with top stops. It is proposed to carry oil in one of the 300-gallon compartments and gasoline in the other two, for distributing them to the various stations of the Fire Department. These tanks are carried on F.W.D. chassis furnished by the Four-Wheel Drive Auto Company of Clintonville, Wisconsin.

WOOD PRESERVING NEWS

The American Wood Preservers' Association, with its office at 1146 Otis Building, Chicago, has just begun the publication of a monthly entitled, "Wood Preserving News," devoted to information concerning the wood preserving industry and the various applications of preserved wood such as creosoted wood blocks, creosoted wood for piles, timbers, etc. The third issue, for the month of April, contains 210 pages of reading matter describing the use of treated timber on farms, for street paving, bridges, etc., and giving standard specifications for creosoting.

PERMANENT GUIDE BOARDS

The Lebanon Machine Company of Lebanon, New Hampshire, manufactures guide boards for highways and city streets made of cast iron supported on an iron post, the board containing raised letters and the whole being practically indestructible. Some



LEBANON GUIDE BOARD

of the posts have round-faced letters with aluminum finish which makes them easy to read at night. Among the signs which they manufacture are town line signs, schoolhouse warnings, railroad crossing signs and other traffic signs, "Silent Policeman," street main signs, etc.

FIRE PUMP FOR VILLAGES

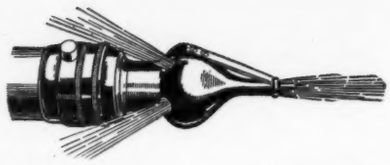
Schramm, Incorporated, has recently developed a small double cylinder engine-driven fire pump costing only a few hundred dollars which offers a means of fire protection for communities that cannot afford an elaborate pumping unit. This consists of a 5-horsepower, double-cylinder, throttle governed, gasoline engine direct connected to a 3-inch by 3½-inch triplex pump delivering 4,800 gallons of water per hour at 100 pounds pressure. The engine has developed more than 5½-brake-horsepower at 690 revolutions per minute. The pump, pistons and cylinders are brass lined and the valves and water passages are extra large. The entire equipment is mounted on a sturdy rubber-tired truck with drawbar and hose basket. Complete, without the hose, it weighs about 1,400 pounds and can be attached to any automobile, wagon or motorcycle or hauled by two men, the wheels being equipped with roller bearings.

VICTORY SELF-PROPELLING NOZZLE

The Self Propelling Nozzle Company of New York City makes an apparatus for cleaning sewers known as the "Victory Self-Propelling Nozzle," which consists of a hollow sphere with a nozzle on the front through which a small stream of water is discharged and relatively large openings in the rear through which water is discharged backward, thus washing the dirt behind it back into the manhole. The holes through which this backwash is discharged are diagonal and the reaction of the water passing through them causes the nozzle to spin and at the same time to move forward; the forward stream meantime breaking up the stoppages so as to permit the forward motion. The nozzle or head revolves, by means of a ball bearing, on a butt which is threaded to connect with a pipe or fire hose. The bearings are steel and the balls are monel metal.

By connecting a steel blade to the forward end of the nozzle a root cutter is formed which revolves with the nozzle and with sufficient force to chop or break up any small sticks, fibres or roots in the path of the nozzle. The blade is made of carbon steel and has a 30-degree bevelled cutting edge.

In using the nozzle, it is attached to one end of a fire hose, the other end of which is attached to a hydrant. The nozzle is then inserted a few feet into



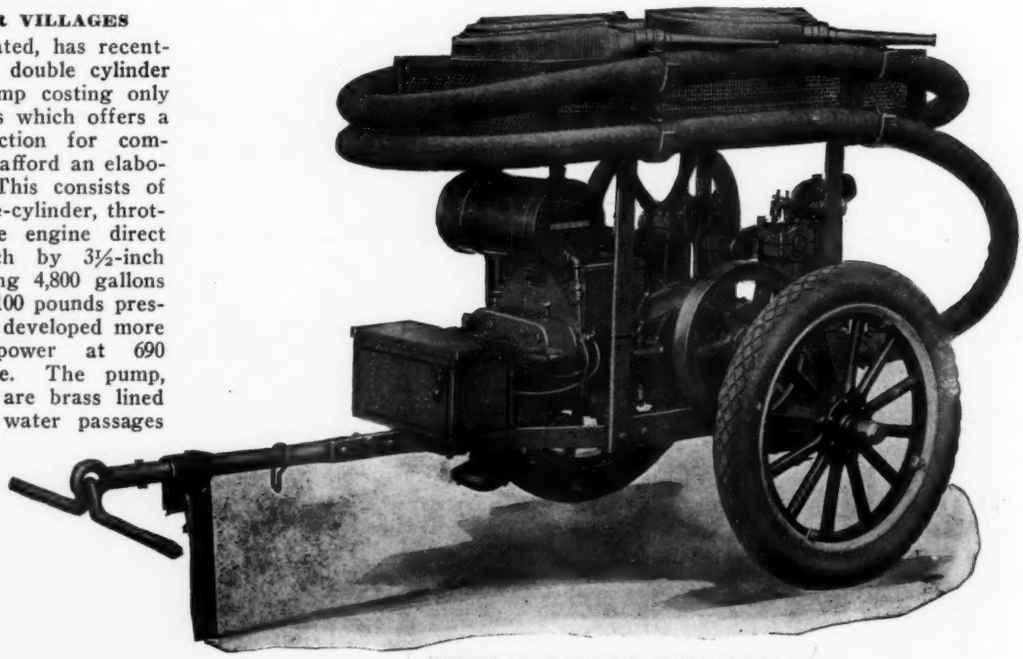
VICTORY SELF-PROPELLING NOZZLE

the sewer and the water turned on full force. The nozzle then travels under its own power, drawing the hose after it. Where there is no deposit, the nozzle will travel at the rate of about 60 feet a minute when the water pressure is 25 pounds at the nozzle. The speed with which it travels through the deposit of course depends upon the nature and amount of the deposit.

This nozzle has also been used for extinguishing fires in coal piles and in places where it was dangerous for men to enter.

IMPROVED HOOK GAUGE

A hook gauge has for years been manufactured by W. & L. E. Gurley of Troy, New York, but they have recently devised certain refinements making for convenience and reliability. The accuracy of the older gauges was believed to be perfectly satisfactory, but the improvements have aimed at eliminating the possibility of inaccurate reading through absence of good light or other troublesome conditions. The new gauge is graduated on a square tube in place of the usual round tube, thus maintaining the tube graduations in proper position to the vernier. The clamp nuts are made more convenient for use and the adjusting screw has been put in line with the graduated scale of the gauge, permitting a fine setting with a minimum of effort.

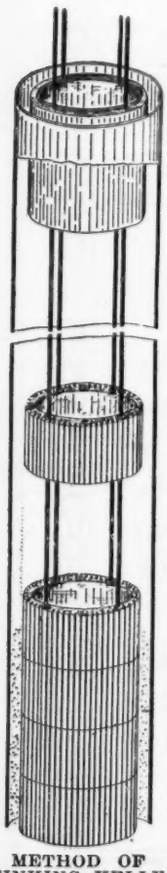


SCHRAMM VILLAGE FIRE PUMP

KELLY CONCRETE WELL SYSTEM

The Kelly Well Company of Grand Island, Nebraska, makes concrete wells on a new principle and has already installed several for cities in Nebraska, Kansas, Michigan and elsewhere.

The Kelly well consists of a series of short tubular sections made of concrete which are placed one on top of the other in constructing the well, a sufficient number of the bottom sections being provided with slots for the admission of water. The wells are generally made of either 18-inch or 25-inch inside diameter. The screen sections are made in 1-foot lengths and the plain sections in 3-foot lengths. The screen sections are made by casting in the outside surface of the concrete casing slots approximately 1/8-inch wide at the outside but enlarged to several times this width just inside the outer surface. In the 25-inch well there are 76 of these slots, each 11 inches long, making an open area totaling 100 square inches for each 1-foot section of screen. In entering the well, the water passes through the narrow slot into the vertical passage just within the surface and falls through this to the joint between two successive sections, where it enters the well owing to the fact that the sections are separated about ½ inch by eight bosses; the outside of the sections, however, being almost in contact to prevent entrance of sand through the joint.



METHOD OF SINKING KELLY WELL

In constructing the well, a steel casing is first lowered to the full depth of the well by the usual sinking methods, this casing being about 10 inches greater in diameter than the outside diameter of the concrete well. Each section of concrete tubing contains four ⅝-inch vertical holes 90 degrees apart, and steel cables are passed through these holes, the cable being held vertical and thus guiding the sections one on top of the other and insuring proper alignment of them. Following this, the annular space between the concrete well and steel casing is packed with gravel up to the top of the screen sections, and above that with soil, the steel casing being meantime removed. The advantage claimed for these wells is that they can in no way rust out or corrode and are thus absolutely permanent. The company claims that they will furnish water free of sand, even in quicksand formation.

FEDERAL METERS

The Federal Meter Company, Brooklyn, New York, manufactures meters from 5/8-inch to 2 inches in size in both frostproof and split-casing types. The bronze measuring chamber is made in two pieces held together by a snap joint and is not distorted by freezing. When the meter freezes, the breaking of the cast iron bottom instantly liberates the measuring chamber and transmission unharmed. The round-reading register records up to 1,000,000 cubic feet or 10,000,000 gallons—ten times the ordinary capacity. The meters are guaranteed for two years from date of shipment against any defect in material and workmanship.

INDUSTRIAL NOTES

PRACTICAL FACTS ABOUT BELTING

The Charles A. Schieren Company has published under the above title, a practical manual on belting and power transmission, based on the company's fifty-five years of practical experience in transmission engineering and compiled by R. C. Moore, secretary and chief engineer of the company. It discusses the different types of drives, belting rules and ratings, care and operation, joining ends of belts, alignment, costs, plant layout, etc. Copies will be mailed free on request.

McWANE PIPE COMPANY'S NEW OFFICE

The McWane Cast Iron Pipe Company of Birmingham announces the opening of a Southwestern Sales Office at 1301 Magnolia Building, Dallas, with J. L. Hill in charge for this territory, which embraces Arkansas, Louisiana, Oklahoma, Texas, New Mexico and Old Mexico. The company, although not yet two years old, has established district sales offices at Birmingham, Philadelphia and Los Angeles. The company produces cast iron pipe in sizes as small as 1¼ inches and 2 inches, with precaulked joint, as described in the May issue of "PUBLIC WORKS."

HOLT MANUFACTURING COMPANY

This company announces that Guy H. Hall, formerly director of the National Institute of Progressive Farming, has been apponted manager of the Division of Public Relations and Sales Promotion, newly created by this company. Mr. Hall assumed his duties on July 1st.

LINK-BELT SALES SCHOOLS

The Link Belt Company has adopted the policy of holding annual sales schools for new salesmen and at the one recently held on June 4th to 6th at the Indianapolis factory of the company, eighteen salesmen were present from offices in Boston, Pittsburgh, Chicago, New York, Dallas and other large cities. The men are carefully examined and instructed in the various malleable and steel chains manufactured and meet the officers and new department heads and also interchange ideas among themselves.

N. P. B. M. A. MONTHLY PRODUCTION RECORDS

The National Paving Brick Manufacturers Association has begun the collection and publication of monthly records of the manufacture of paving brick, showing for nine different classes of brick, the number in stock at the first day of the month, number manufactured during the month, shipments during the month and stock on the last day of the month; also unfilled orders on the first of the month, orders received during the month, orders cancelled during the month and total unfilled orders on the last day of the month. These figures are obtained from the individual manufacturers and combined so as to show the status of the business each month. Figures collected for April and May represented 67 per cent. of the normal tonnage capacity of the industry.

TRAINING OF OXY-ACETYLENE WELDERS

The American Welding Society has just issued an outline of a course for the training of oxy-acetylene welders.

This report was prepared by a committee and combines the experience of experts of the Federal Board of Vocational Education, the American Welding Society and the National Research Council. For the information of the person who is selecting candidates, the text includes a discussion of the qualifications which the candidates for training should possess. For the information of the instructor, the text includes the fundamentals in gas welding, together with a detailed statement of content, classified under type welding jobs arranged in the order of difficulty. Copies may be secured from the American Welding Society, 29 West 39th Street, New York City.

WHITE MOTOR TRUCKS

The White Company, Cleveland, informs us that the City of New York has placed with it an order for 100 2-ton power dumping trucks, making 135 White trucks this year. This last 100 trucks will be used by the Street Cleaning Department for collecting rubbish and the bodies will have a capacity of 14 cubic yards. The city now owns 551 White trucks.

NEWS OF THE SOCIETIES

CALENDAR

Aug. 20th — 23rd—ASSOCIATION OF AMERICAN CEMETERY SUPERINTENDENTS. Annual convention at Harrisburg, Pa. Secretary, W. B. Jones, Pittsburgh, Pa.

Aug. 30th—Sept. 1st—UNION OF CANADIAN MUNICIPALITIES. Annual convention at Shawinigan Falls, Quebec. Secretary, A. D. Shipley, 10 St. John St., Montreal, Que.

Sept. 10th—14th—LEAGUE OF CALIFORNIA MUNICIPALITIES. Annual convention at Coronado, Calif. Secretary, Wm. J. Locke, Pacific Bldg., San Francisco.

Sept. 10th—15th—AMERICAN INSTITUTE OF PARK EXECUTIVES. Annual convention at Kansas City, Mo. Secretary, Will O. Doolittle, Minot, N. D.

Sept. 11-14—AMERICAN SOCIETY OF SANITARY ENGINEERS. Annual convention at Davenport, Ia.

Sept. 18th—21st — NEW ENGLAND WATERWORKS ASSOCIATION. Annual convention at Burlington, Vt. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston.

Sept. 25th—28th—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention at Reading, Pa. Secretary, Clarence R. George, Houston, Tex.

Sept. 27-28—INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS. Annual conference, Hotel La Salle, Chicago. Secretary, A. M. Anderson, 10 S. La Salle St., Chicago.

Oct. 8-13—AMERICAN PUBLIC HEALTH ASSOCIATION. Fifty-second annual meeting, Boston, Mass. Secretary, A. W. Hedrich, New York City.

October 15-17—AMERICAN SOCIETY OF CIVIL ENGINEERS. Fall meeting, Richmond, Va.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Atlanta, Ga. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. 13th—15th—CITY MANAGERS ASSOCIATION. Annual convention at Washington, D. C. Secretary, John G. Stutz, Lawrence, Kans.

Nov. 15-17—NATIONAL MUNICIPAL LEAGUE. Twenty-ninth annual meeting, New Willard Hotel, Washington, D. C.

Nov.—OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

Dec. ....—NATIONAL ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at New Orleans.

Jan. 13-19—AMERICAN ROAD-BUILDERS' ASSOCIATION. The annual convention and National Good Roads Show. Chicago, Ill.

Feb. 25-28—AMERICAN CONCRETE INSTITUTE. Annual convention, Chicago. Secretary, Harvey Whipple, 1807 East Grand Boulevard, Detroit

WESTERN ASSOCIATION OF STATE HIGHWAY OFFICIALS

The semi-annual conference of this association was held at Salt Lake City, Utah, on July 10 and 11. The states represented were California, Nevada, Utah, Wyoming, Colorado, Idaho and Arizona, and a number of representatives of the Bureau of Public Roads were present. The object of the conference was to confer on various questions affecting the interests of the western states on which a uniform policy could be adopted and be prepared to present the interests of these states as a group at the meeting of the National Association of State Highway Officials at New Orleans next December.

Among the subjects discussed were Continuance of Federal Aid, Continuance of Forest Highway Aid, Federal Aid on Highway Construction Across Indian Reservations, Surety Bonds versus Personal or Collateral Surety on Contracts, Gravel Road Specifications, Culvert Headwall Specifications, Uniform Accounting and Financial Reports, Present Status of Federal Aid Allotments, Disposition of Surplus War Material, Federal Aid on Highway Maintenance.

A number of resolutions were adopted by the association setting forth the views of the organization on these subjects, such resolutions to be presented at the National Association meeting later in the year. Possibly the most important of these was that urging the continuance of Federal aid to the states under the present plan, such aid to be at the rate of one hundred millions dollars per year; also urging the continuance of Forest Highway aid at the rate of ten million dollars per year. This action was taken because the last allotments of Federal aid under present appropriations become available on July 1, 1924, and it was brought out at the meeting that all of these western states now have, or will have, all of their available Federal aid under agreement or contract by December 1 of the present year. This resolution urging the continuance of Federal aid will be presented at the National Association meeting and the western states as a unit will urge its adoption for presentation to Congress.

Much discussion revolved around the question of surety bonds on contracts, some of the states being opposed to anything except surety bonds, while others, due to some unsatisfactory experiences in claim adjustments with surety companies, were inclined to favor either personal or collateral surety. A special committee consisting of a representative from each state was appointed to investigate this matter and to report back at the next meeting with a definite recommendation.

The question of specifications, particularly those for gravel roads and culvert headwalls, came in for lengthy discussions. It was agreed that a gravel specification could not be adopted as an absolute standard for all the western states. However, the Bureau representatives and some of the states agreed that a policy could be followed out working toward a maximum and minimum gravel size which would practically secure a standard for this class of work.

The disposition of surplus war material secured by the states, particularly such equipment as is unserviceable or is unsuited to road building activities, occupied the attention of the meeting for some time. Final action resulted in the adoption of a resolution urging that the states be permitted to sell such equipment to the highest bidder, the proceeds from such sale to be invested in the purchase of new equipment suitable to the needs of the states.

A special sub-committee consisting of the accounting representatives present was appointed to investigate and report on the matter of a uniform system of accounting for the western states and to make recommendations along this line. This committee after several meetings brought in a report recommending the creation of a permanent sub-organization of accounting representatives of the eleven western states to go into this matter thoroughly and formulate and work out such a uniform accounting plan and general financial procedure. The general convention then adopted a resolution creating such a permanent sub-organization, this organization to prepare and report its findings and recommendations to the general meeting at New Orleans. A temporary organization of the accounting sub-organization under the title of the Western Association of Highway Accountants, was organized with Sam B. Jones of Arizona as president, Geo. Mitchell of Colorado as vice-president, and Floyd O. Booe of Nevada as secretary.

The meeting closed with the election of Howard C. Means, state road engineer of Utah, president; T. E. Laird, superintendent of highways of Wyoming, vice-president; and George W. Borden, state highway engineer of Nevada, Secretary.

PERSONALS

Murray, Paul D., of New Philadelphia, Ohio, has been appointed assistant director of highways and public works of that state.

Schlessinger, G. F., of Xenia, Ohio, has been appointed state highway engineer of that state. He was formerly chief deputy of construction of the highway department of that state.

Hawkins, E. H., formerly city manager of El Dorado, Kans., has been appointed city manager of Kinsley, Kansas, at a salary of $3,000 a year.

Asmus, Lewis D., of the U. S. Bureau of Public Roads, has been transferred from Austin, Tex., to Baton Rouge, La.

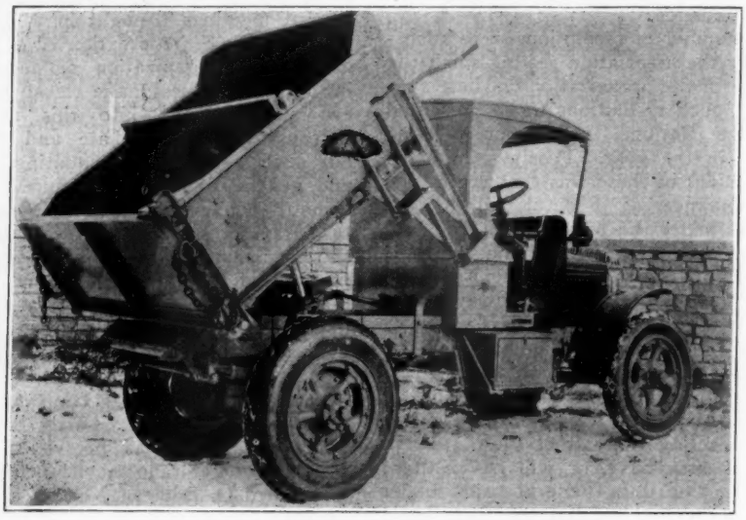
Allen, Tom J., recently in the engineering department of the Santa Fe R. R., has been elected city manager of Coronado, Cal.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

ROAD CONTRACTORS SPECIAL

The new Atterbury Contractors' Special truck, built on the company's latest chassis, has a number of new features and refinements in design. The chassis has the latest type of Continental motor with removable heads and pressure-feed lubrication. The transmission is located amidship with four speeds ahead and one reverse. There is an all-steel semi-enclosed cab with doors and built-in glass windshield, and complete electric lighting equipment with Delco generator and Willard storage battery.



ATTERBURY ROAD CONTRACTORS' SPECIAL

The body is a 2½-yard, equipped with double-acting tail gate and swinging partition mounted crosswise. Slanting plates at the rear of the body confine the discharging load to a narrow width so that it all goes into the mixer skip without spilling over the sides. A Heil hydraulic hoist gives positive control of the dumping angle. The machine is built by the Atterbury Motor Car Company of Buffalo.

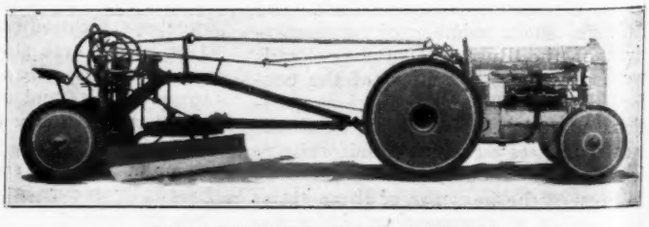
AVERY POWER SCARIFIER

The Avery Company has produced a power scarifier which is claimed by the company to be the first scarifier operated by the power of the motor that has ever been put on the market.

The attachment has a suitable reducing mechanism driven by a clutch on the motor crankshaft which drives another shaft mounted under the subframe of the machine. The crankshaft drives a rock-shaft drive at the rear end of the machine through spring leaded pitman rods which raise or lower the teeth, the springs acting as shock absorbers. The teeth are driven into the ground by a toggle mechanism under great pressure. The tooth bar is 4-inch square steel turned down at the ends for a 20-inch gauge wheel. The teeth are adjustable to side swing, depth and angularity to the ground. Seven teeth are furnished made of 1¾-inch square tool steel 32 inches long and pointed at both ends. When they enter the ground 9 inches they will clear 11 inches when lifted. The pull strains of the scarifier are taken by the draw bar. The attachment is designed for use with an Avery 25-50-horsepower 10-ton road roller tractor.

CASWELL ROAD GRADER

A road finisher and road grader are manufactured by the Caswell Manufacturing Company of Cherokee, Illinois, to be attached to a Fordson tractor. The two are practically the same except that the road finisher is equipped with rubber tires and roller bearings while the grader is equipped with steel wheels, for light construction and heavy maintenance. The former weighs 1,750 pounds and the latter 1,400 pounds. The blade can be any length, but the regular equipment for the finisher is 8 feet, and for the grader 6 feet. The blade control is by worm adjustment, and the control parts are accessible from the seat. The wheels are mounted on steering knuckles. The end of the blade may be operated at least two feet outside of the grader wheel, a valuable feature for ditching.



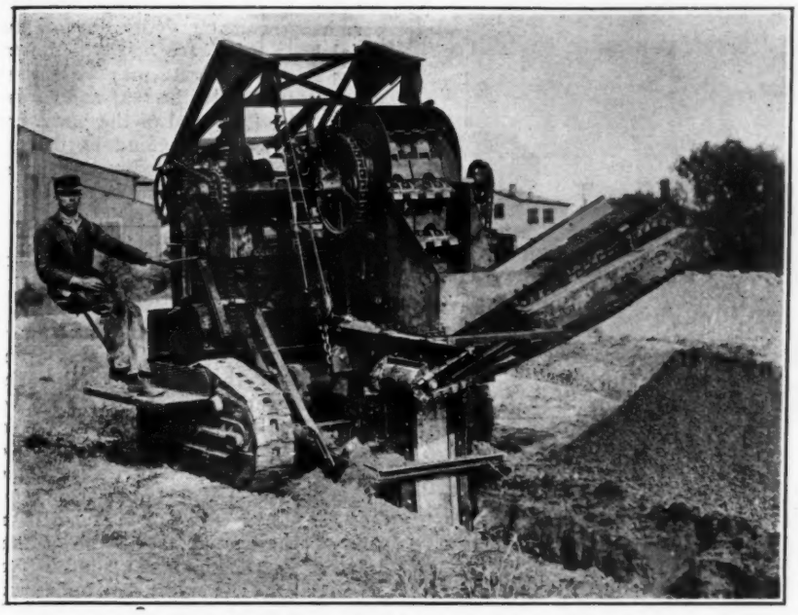
THE CASWELL ROAD GRADER.

GASOLINE TRACTOR CRANE

The Penn Bridge Company of New York City furnishes a gasoline crane known as the "Beaver" to meet the demand for an efficient but inexpensive and simply constructed machine. It is recommended for unloading cars or barges of road material, for handling logs or lumber where permanent facilities are not available, and similar work. It was developed especially for the American Telephone & Telegraph Company's use for handling poles in their various treating and storage yards. It is equipped with either a hook or a clamshell bucket.

Exclusive features claimed for the machine are: Its ability to operate at its rated capacity without the use of any outriggers or jacks; to turn in a radius as small as 16 feet, owing to its extremely short wheel base and the special construction of the front axle and car body; and that the boom may be operated through a clear arc of about 315 degrees.

The gasoline motor has 30 to 50-horsepower according to the load requirements. All functions of the crane except steering are accomplished by individual friction clutches. The construction is of steel throughout, unless wood is preferred for the boom. The total weight without load is 10 tons, as compared to 15 tons for most of the similar cranes of this type. The normal capacity is a half-yard clamshell for sand, ¾-yard clamshell for coal, or 2 tons on the hook, all at 24-foot maximum radius; while its maximum capacity is 4 tons at 12½-foot radius. The height of the top of the mast is 12 feet. The width from out to out of the caterpillars is 10 feet and the wheel base 9 feet. The tractor drive is by means of a countershaft fitted with a differential gear similar to that used in automobiles, so that equal drive is attained in turning corners and any difficulty in steering is eliminated.



BARBER-GREENE VERTICAL-DIGGING DITCHER

BARBER-GREENE VERTICAL-DIGGING DITCHER

The Barber-Greene Company of Aurora, Illinois, is supplying contractors with a new light ditcher which will dig straight down to a depth of 5 feet and a width of either 7½ inches or 15 inches. The digging speed can be varied, but it is claimed that under favorable conditions the machine will dig a 15-inch ditch 4 feet deep at the rate of 3 feet per minute. This type of boom construction permits digging close to obstructions and turning corners. The machine is mounted on a standard chassis which carries the Barber-Greene bucket loader and is interchangeable with it. The chassis is provided with crawler traction. The boom is of box type. The buckets are self-cleaning cast steel with manganese steel digging lips having two teeth and three teeth alternately. Power is furnished by a Buda 25-horsepower gasoline engine. The crawler has a continuous tread 60 inches long and 10 inches wide. Special slow speeds provide for running the crawler while the machine is digging. The digging speed is regulated by changing gear and pinion. The machine is 13 feet 6 inches long, 8 feet wide and 11 feet high and weighs approximately 6 tons.

ROCK TRUCK HOIST

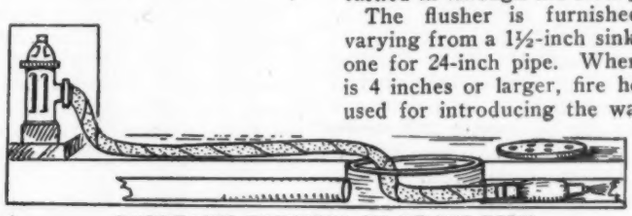
The Rock Manufacturing Company of Waterloo, New York, turns out a hoist for motor truck dump bodies known as Rock Type H Hoist. It can be applied to any truck and is guaranteed up to 3½-tons capacity. The lifting arms are bolted directly to the front bolsters and impose no load on the front end of the body when the load is lifted; and as no part of the hoist extends below the truck frame between the side rails, it does not interfere with brake rods, cross members, etc. A ratchet is provided to hold the load in any position and a brake enables the body to be lowered quickly and with little effort. The total space required for the hoist between the body and the cab is 9 inches, and the total height above the frame is about 72 inches. The weight of the hoist is about 215 pounds and that of the body hinge is 45 pounds.

The most durable and suitable materials of the best grade are used throughout. The greater part of the construction is of rolled steel and malleable iron castings. The hoist can be applied to frames between 30 inches and 39 inches in width without change. The dumping angle attained will be from 35 degrees to 45 degrees, depending upon the length of the body.

DRAIN PIPE CLEANER

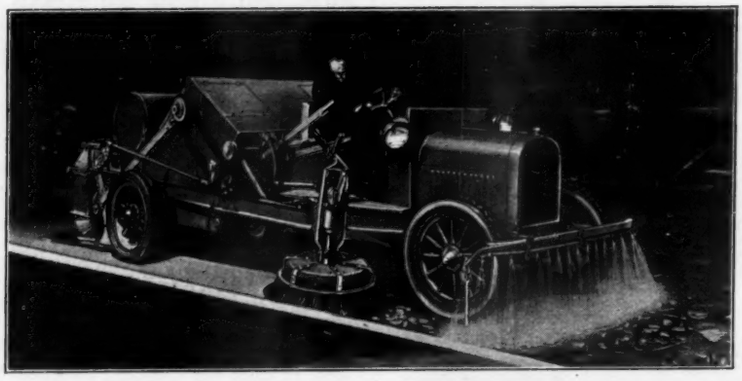
The Petersen Hydraulic Flusher, manufactured by the Petersen Hydraulic Flusher Company of Milwaukee, is used for clearing clogged waste pipes and drains of any size. The appliance consists of a bag of flexible waterproof material protected with heavy ducking which has a hose coupling in one end and a nozzle in the other. The bag is made in different sizes to fit the size of pipe to be cleaned. It is inserted in the end of the drain and water turned in to the bag through a hose connection, when the bag expands and forms a plug in the pipe while water escapes with velocity from the nozzle at the forward end of the bag. The bag prevents the water flowing back in the pipe and it produces a pressure that finally compels it to find outlet through the obstruction. If used in the bottom of a manhole where some depth of water has been occasioned by the obstruction, a steel pipe with the bottom end turned at a right angle can be screwed into the bag instead of the hose, the bag inserted into the sewer pipe in this way and water turned in through the steel pipe.

The flusher is furnished in sizes varying from a 1½-inch sink flusher to one for 24-inch pipe. Where the pipe is 4 inches or larger, fire hose can be used for introducing the water.



PETERSEN FLUSHER IN DRAIN PIPE

ROCK HOIST, TYPE H.



THE "CHILDS" MOTOR PICK-UP STREET SWEEPER.

MOTOR PICKUP SWEEPER

The Foamite-Childs Corporation of Utica, New York, has this year brought out as a new product the Childs Motor Pickup Street Sweeper, for which it claims low initial and maintenance costs, endurance, one-man convenience, quiet, dustless operation, self-adjusting gutter broom, and standard truck parts. The company states that the designer has been studying street-sweeping equipment for thirteen years.

The sweeper is mounted on a Reo Speedwagon 4-wheel chassis, which is strictly a one-man machine. Each rear wheel is operated by a roller chain from jack shafts running over cut-steel sprockets. There is a large broom 32 feet in diameter by 6 feet long operated by a roller chain which can be quickly adjusted to the roads and is automatic in operation after adjustment. The conveyor is all-steel construction with removable bottom, of the rubber squeegee type, squeegees mounted on steel angles forming the flights. This carries the material to an all-steel hopper or dirt receptacle which can be opened and closed from the driver's seat and has a capacity of 50 cubic feet.

There is a gutter broom 30 inches in diameter in six segments that are easily and quickly changed when the broom is worn out. This broom is operated by bevel cut-steel gears running in an oil bath. It is automatic in operation and will follow the curb whether the driver does or not, with a working range of 7 inches. Water runs by gravity from a 150-gallon galvanized iron tank to a rotary pump, which forces the water to brass nozzles mounted under the bumper in front, the water spray being controlled by the driver.

The manufacturers inform us that Augusta, Georgia; Massena, New York, and Elmira, New York, have recently purchased these sweepers.

CROOKE TRUCK BODY

A new all-service truck body for 1-ton Ford chassis is manufactured by the New York Central Iron Works Company of Hagerstown, Maryland. This body has a nominal capacity of 1 ton and a cubic capacity without surcharge of 36½ cubic feet, the dimensions being 72x44x20 inches. The body is built of No. 10 steel plate throughout, reinforced with steel angles with welded and riveted construction. The substructure is of 4-inch steel channels riveted together with suitable angle iron connections and the dumping shaft is of 1¼-inch cold rolled steel. It can be fitted to the chassis in 15 minutes by placing six bolts that are supplied with the body, no drilling being required. The extreme dumping angle is about 45 degrees. It can safely carry a 100 per cent. overload such as 2 tons of stone or other heavy commodities.

The load is dumped by a crank operated by hand on either side of the body. The tail gate is made to open automatically for dumping sand, gravel, etc., closing automatically when the body returns to horizontal position. Or the tail gate may remain in position when the body dumps, thus permitting control of the flow of material by a coal gate fitted in the tail gate; or the tail gate may be entirely disconnected from the rear and thrown over to the front end of the body, permitting objects to extend beyond the end of the body or facilitating the removal of boxes, cement bags, etc.

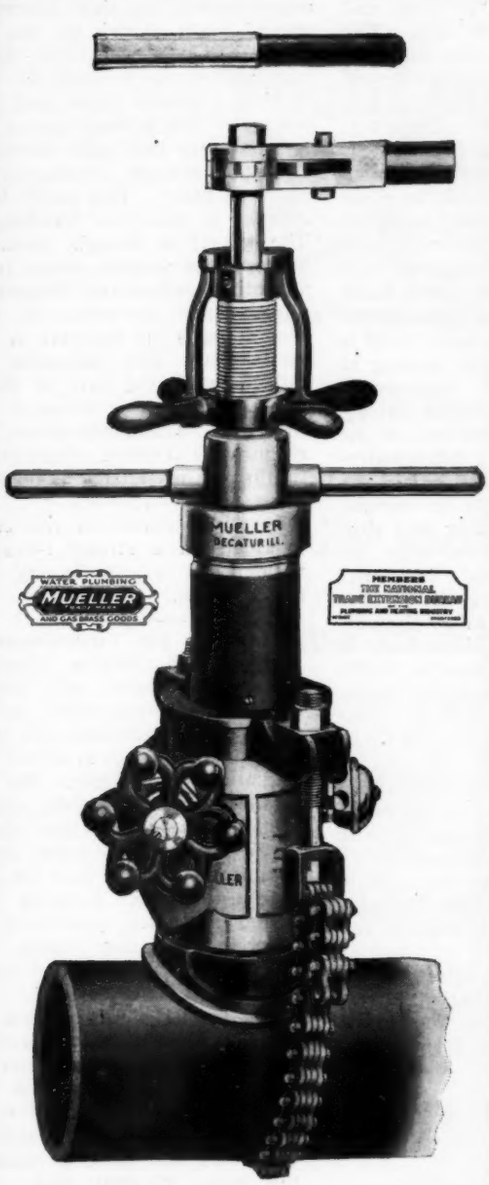
CROOKE TRUCK BODY IN DUMPING POSITION.

THE DELAVAL MULTI-STAGE CENTRIFUGAL PUMP

A new style of centrifugal pump called a "series pump" is being manufactured by the DeLaval Steam Turbine Company of Trenton, New Jersey. In this pump double suction impellers and volute diffusers are used, as in single-stage centrifugal pumps. The connecting passages from stage to stage, however, are included in the pump case casting, as in the ordinary multi-stage pump. The advantages claimed are: Perfect hydraulic axial balance and high efficiency under varying loads, as is characteristic of the single-stage pump. These series pumps are made with two or three stages. Where more than three stages are required, the use of two independent pumps operating in series and mounted on a single base plate is recommended in order to keep down the length of shaft between bearings.

BLACK TRAFFIC MARKING PAINT

The Paint Department of the Du-Pont Company announces that they have developed a traffic black for marking concrete and other light-colored pavements which dries dust-free in 15 minutes, tack-free in 30 minutes and into a hard, elastic film in 5 or 6 hours. After being in daily use for ten weeks in several cities it still retains its durability and color.



MUELLER No. "A" Water Tapping Machine

is designed for tapping water mains and inserting corporation cocks under pressure, from 1" to 2" in size. The "A" Machine embodies the latest improvements and represents the most approved practice in both construction and operation.

Good tools pay big dividends

Scientific management has proved that the better the tools the quicker the job gets done.

Nine-tenths of all Water Works have proved by actual test that *MUELLER* Tapping Machines are best.

The No. "A" *MUELLER* Tapping Machine

taps water mains and inserts corporation cocks under pressure, even when above 90 pounds. Equipped with combined drills and taps with *MUELLER* thread in 1", 1¼", 1¾" and 2" sizes.

With this Machine one man can tap and insert more corporation cocks per day than by any other method—and every joint will be true and tight.

Write for details and prices.

H. Mueller Mfg. Company
Decatur, Ill., U. S. A.
PHONE BELL 153

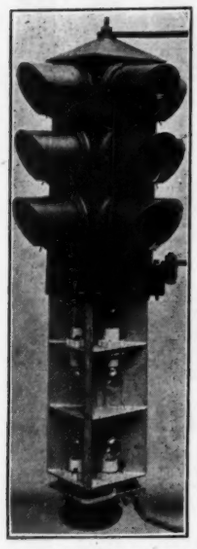
Water, Plumbing and Gas Brass Goods and Tools

New York City,
145 W. 30th St.
Phone Penn. 2468

San Francisco,
635 Mission St.
Phone Sutter 3577

Sarnia, Ontario, Canada

Mueller Metals Co., Port Huron, Mich., Makers of "Red Tip" Brass Rod; Welding Rod; Brass and Copper Tubing; Forgings and Castings in Brass and Bronze; also Brass Screw Machined Products.



Control box, inner shell lowered.

Mounted on light standard.

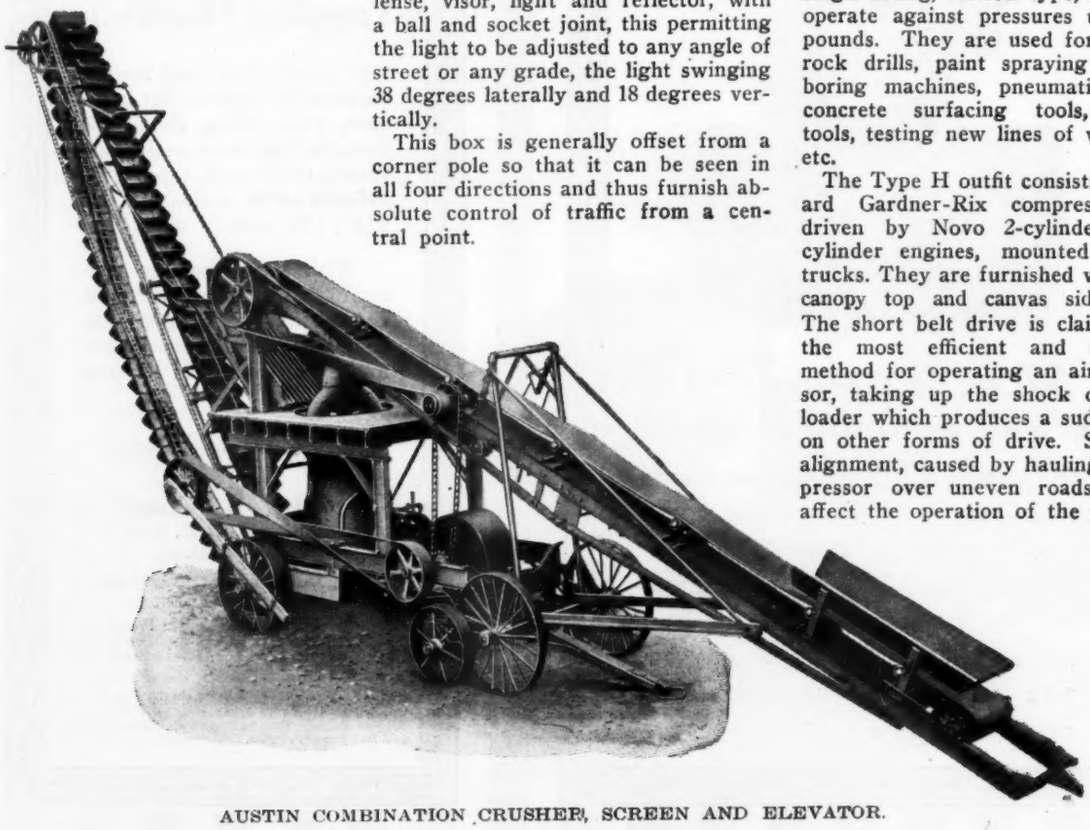
MACKNEL TRAFFIC CONTROL.

MACKNEL TRAFFIC CONTROL BOX

The Macknel Signal Manufacturing Company of Lancaster, New York, manufactures what it calls a Traffic Control Box, which consists of a set of three lights thrown by lenses in each of four directions for the control of traffic, this box being ordinarily attached at a considerable height above the street to lighting standards or other poles; or it can be supported on a concrete base. The lights are furnished by 25 or 50 watt incandescent bulbs. The lenses used are standard railroad bull's-eye lenses, 4½ inches in diameter in the type "A" box and 6⅜ inches in the type "B" box. The lenses are adjustable so that the light beam can be set at any angle to meet local conditions as to grades, etc. The box is equipped with an audible signal, which sounds when the light is about to be changed from red to green or vice versa. It is possible to show red in all directions at once in emergencies such as fires, serious accidents, etc., and the audible signal rings continuously meantime. The box is made entirely of cast aluminum and is guaranteed rust proof. The outer shell is cast in one piece with an opening at the bottom, making it waterproof, while all joints where the visors around the lenses are attached to the box are ground to give a tight, waterproof fit. Although substantial, the aluminum makes it light in weight, the type "A" box weighing less than 75 pounds complete and the type "B" box less than 100 pounds. The inner aluminum shell containing the electric bulbs and wiring, drops below the outer shell, where it is held securely in position, to allow for changing bulbs or other adjustments. Another advantage claimed is that each of the three colors is on the same light level on all four sides.

In the type "C" box, each signal light has a separate unit composed of lense, visor, light and reflector, with a ball and socket joint, this permitting the light to be adjusted to any angle of street or any grade, the light swinging 38 degrees laterally and 18 degrees vertically.

This box is generally offset from a corner pole so that it can be seen in all four directions and thus furnish absolute control of traffic from a central point.



AUSTIN COMBINATION CRUSHER, SCREEN AND ELEVATOR.

AUSTIN CRUSHING PLANTS

The Austin Manufacturing Company of Chicago advertises plants combining crusher, screen and elevator, all manufactured by this company. A typical plant shown by the illustration shows a conveyor for feeding gravel to a portable gyratory crusher, a grizzly screen and a folding elevator. The folding type of elevator is convenient and easily handled when a portable crusher is being moved from place to place. This outfit is recommended as ideal for handling gravel. The gravel is brought from the pit by means of wagons, drags, fresnos or any other method and dumped through a trap upon the conveyor, which in turn deposits the material on the grizzly screen. The undersize material falls between the bars of the screen directly upon the elevator buckets, while the oversize rolls downs the grizzly into the crusher. From the crusher the broken material falls onto the elevator.

In all combinations the crusher is mounted on a strong I-beam frame with heavy wheels having tires of ample width.

NOVO AIR COMPRESSORS

The Novo Engine Company of Lansing, Michigan, calls attention to its air compressor outfits, which have as distinctive features belt drive and individual cooling systems for both engine and compressor. The compressors are of the duplex, single-stage, single-acting, vertical type, designed to operate against pressures up to 100 pounds. They are used for operating rock drills, paint spraying machines, boring machines, pneumatic riveters, concrete surfacing tools, caulking tools, testing new lines of water pipe, etc.

The Type H outfit consists of standard Gardner-Rix compressors, belt driven by Novo 2-cylinder and 4-cylinder engines, mounted on steel trucks. They are furnished with a steel canopy top and canvas side curtains. The short belt drive is claimed to be the most efficient and economical method for operating an air compressor, taking up the shock of the unloader which produces a sudden strain on other forms of drive. Slight misalignment, caused by hauling the compressor over uneven roads, will not affect the operation of the plant.

The company also makes a combination hoist and air compressor, in which a duplex, single-acting, vertical air compressor is driven by belt and a Type G hoist by gear, both by a Novo 4-cylinder engine. The entire outfit is mounted on a channel steel base with skids.

THE BUTLER VACUUM STREET SWEEPER

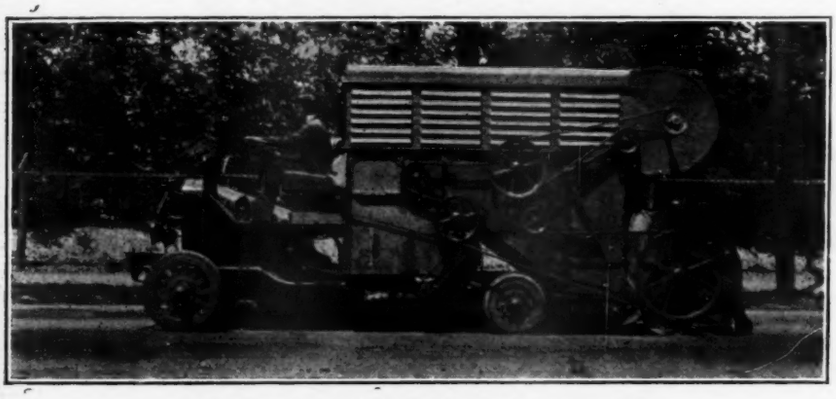
This is a suction sweeper manufactured by the Butler Manufacturing Company of Cleveland which, although new, has been used continuously on one contract for a period of ten months. It is operated by a standard gasoline motor, power being taken from a drive shaft for driving a fan, a conveyor and a broom, with all of the working parts of the sweeper on the outside.

The broom, which is carried in a round broom case at the rear, "floats" so as to adapt it to an uneven surface, being supported by rubber tired casters, and is driven by a rope drive. This broom loosens the dirt and picks up the heavy material, dropping it on an inclined conveyor. The conveyor carries the dirt upward and forward and dumps it into a dust compartment.

Immediately above the broom case is a fan in a round housing which sucks up fine dust from the pravement and sifts it through 240 vacuum cleaner bags that are carried at the top of the body, the sides of the body being provided with louvres for permitting the escape of the air. From these bags the dust drops down into the dust compartment, which can be equipped with cans to catch and facilitate removing the dirt if desired The machine is equipped with ball or roller bearings throughout.

The sweeping mechanism is controlled by a single lever from the driver's seat in front. When not sweeping, the broom is raised clear of the pavement. The broom case is so constructed that the edge of the broom removes the dirt from the angle between the curb face and the pavement The working speed is between 4 and 8 miles per hour, depending on the condition of the street, and the machine will sweep approximately 15,000 square yards an hour. Where a second sweeping is required, it can be made at the higher speed and cover the ground at approximately double this rate.

The makers claim that streets can be cleaned at half present cost per thousand square yards when cleaning at the rate of 100,000 square yards per day; that the sweeper will pick up everything from brick bats to the finest dust and deposit them in the dust bin without creating any dust, and that it can be operated in conjested traffic. No water is required in connection with the cleaning.



VACUUM STREET CLEANER IN SERVICE

INDUSTRIAL NOTES

BARBER-GREENE SNOW LOADERS

The Barber-Greene Company is at work this hot weather filling orders recently received for snow loaders from Albany, New York; Springfield, Massachusetts; Providence, Rhode Island, and Ottawa, Canada, while other orders are expected. The first snow loader was tried out in Chicago in 1920 and that city now has four of these machines while others are owned by New York, Philadelphia, Pittsburgh, Albany, Schenectady and street railway companies in New York and Boston.

PAVING BRICK SHIPMENTS DECREASING

Statistics compiled by the National Paving Brick Manufacturers Association from companies representing 67 per cent. of the tonnage of the paving brick industry show 27¼ million brick shipped in June as against 26.2 million in May. Of the June shipments, 18.6 million went into city streets and 5.6 million into country highways; the remainder being used for private drives, factory floors, etc.

EVINRUDE IN SANTO DOMINGO

The city of Santo Domingo with 20,000 population, which has heretofore been entirely without fire protection, is reported to have purchased an Evinrude High Pressure Pump, which draws water from rain water cisterns for furnishing fire protection, there being no water mains or other public water supply. The pump used has a two-cylinder, two-cycle, 4-5 h. p. gasoline engine directly connected to a "Viking" 1½-inch high-pressure pump, the total combined weight being only 99½ pounds. It is designed to pump against 120-pound pressure, but has reached 150 and even 180 pounds per square inch. This pump has thrown an 80 ft. stream through a ¼-inch nozzle, while in another test it threw a 50 ft. stream through a ¼-inch nozzle attached to 1,500 feet of 1½ in. hose.

SERVICISED PRODUCTS CORPORATION

A. C. Fischer, trading as The Servicised Products Co., has sold the furniture and fixtures at his office, 38 South Dearborn St., Chicago, and machinery, equipment, manufactured goods, chattels and effects in and about his business at the Desplaines, Illinois plant, to The Servicised Products Corporation, of which A. C. Fischer is President. It is stated that this action is taken in order to enlarge production which the growth of the business demands.

Mr. Fischer retains the Alexandria, Indiana, plant, and will continue business under the title of Servicised Products Co. (not incorporated).

WESTERN WHEELED SCRAPER CO.

W. G. Sharretts has been transferred from the Atlanta territory to take charge of the New York office at Room 1176, 50 Church St. Mr. Sharretts will have charge of domestic sales in the Eastern territory, with contractors as well as with industrial and railroad companies, selling arrangements heretofore existing in New York having been cancelled.

ORTON & STEINBRENNER CO.

Orton & Steinbrenner Co., manufacturers of locomotive cranes, dipper shovels, and clam shell buckets, of 608 So. Dearborn St., Chicago, announce the addition of Mr. J. J. Murphy to their Chicago sales force. Mr. Murphy formerly was the Chicago representative for the Browning Engineering Company, of Cleveland.

WESTON SEWER JOINTS

The city engineer of Hartford, Connecticut, R. N. Clark, writes us that, in laying sewer pipe in that city, "joints made with the Weston patent form were used in wet trenches. Under those conditions we consider them more satisfactory than the ordinary mortar joint, more convenient to use on the job than bituminous joints. Prices bid on the few we have considered were about the same as for bituminous joints."

NEWS OF THE SOCIETIES

CALENDAR

Sept. 18th—21st — NEW ENGLAND WATERWORKS ASSOCIATION. Annual convention at Burlington, Vt. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston.

Sept. 25th—28th—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention at Reading, Pa. Secretary, Clarence R. George, Houston, Tex.

Sept. 27-28—INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS. Annual conference, Hotel La Salle, Chicago. Secretary, A. M. Anderson, 10 S. La Salle St., Chicago.

Oct. 8-13—AMERICAN PUBLIC HEALTH ASSOCIATION. Fifty-second annual meeting, Boston, Mass. Secretary, A. W. Hedrich, New York City.

Oct. 17-20 — AMERICAN SOCIETY OF CIVIL ENGINEERS. Fall meeting, Richmond, Va.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Atlanta, Ga. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. 13th—15th—CITY MANAGERS ASSOCIATION. Annual convention at Washington, D. C. Secretary, John G. Stutz, Lawrence, Kans.

Nov. 15-17—NATIONAL MUNICIPAL LEAGUE. Twenty-ninth annual meeting, New Willard Hotel, Washington, D. C.

Nov. — OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahiman, Cincinnati Filtration Plant, California, O.

Dec. ....—NATIONAL ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at New Orleans.

Jan. 13-19 — AMERICAN ROAD-BUILDERS' ASSOCIATION. The annual convention and National Good Roads Show, Chicago, Ill.

Feb. 25-28—AMERICAN CONCRETE INSTITUTE. Annual convention, Chicago. Secretary, Harvey Whipple, 1807 East Grand Boulevard, Detroit.

AMERICAN SOCIETY OF CIVIL ENGINEERS

The Fall meeting of the Society will be held at Richmond, Virginia, on October 17th to 20th, headquarters being at the Jefferson Hotel. There will be a combination of technical and social features and ladies are especially invited, as excursions and other features have been planned for their entertainment.

On Wednesday, October 13th, the meeting will be called to order by James J. Anderson, president of the Virginia section, and short addresses will be made by Governor Trinkle and Charles F. Loweth, president of the society. There will follow a discussion of various phases of highway transportation problems, and in the afternoon there will be a meeting of the highway division at which the development of highway systems will be discussed. There will also be held during the afternoon an informal conference of representatives of local sections, each section having been asked to delegate some member to represent it at this conference without expense to the society.

Following these meetings, members and guests will motor to points of historic interest in the city. An entertainment illustrative of old plantation life in Virginia, followed by dancing, will conclude the first day.

On Thursday a discussion of the port problems of Norfolk and vicinity, the development of water transportation on Chesapeake Bay and its tributaries, and the research program of the U. S. Bureau of Public Roads will occupy the morning session. In the afternoon members and guests will go by special train to Williamsburg, Virginia, to visit points of historic interest, dinner being served at William and Mary College. The party will then motor to Jamestown and after visiting points of interest here will be taken by special boat to Norfolk, Virginia, providing a moonlight ride on the James river, with dancing. The party will spend the night on the boat and will disembark at Norfolk Friday morning and motor to points of interest in the vicinity, including the Army and Navy bases, following which it will be taken in boats around the harbor and to Yorktown, where historic points will be visited; thence by boat up Chesapeake bay and the Potomac river to Washington, which will be reached early Saturday morning.

On Saturday the members of the party interested in highways will be taken by automobile to inspect the road tests at Arlington Farms, Virginia, while others will be given opportunity to visit other points of interest. The entire party will assemble for luncheon as guests of the District of Columbia section, after which there will be a motor trip about Washington and its environs. Return to Washington will be made in time to arrange for departure on early evening trains.

SAN FRANCISCO SECTION, A. S. C. E.

The San Francisco section of this society held an excursion and barbecue on August 11th at Sunol, California, as guests of the Spring Valley Water Company. About eighty members and guests were taken by automobile to the Calavaras Dam and the new reinforced concrete viaduct under construction in Niles Canyon. After the dinner George A. Elliott, chief engineer of the company, spoke on the immediate development and delivery of an additional water supply for San Francisco.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

The Nominating Committee of the American Society of Mechanical Engineers has presented the following nominees for the officers of the society, to be elected by ballot in the Fall:

President, Fred R. Low, editor of "Power," New York City; vice-presidents, George I. Rockwood, president and treasurer of the Rockwood Sprinkler Company, M. L. Cooke, consulting engineer in management, Philadelphia and W. J. Sando, consulting engineer, Milwaukee; managers, E. O. Eastwood, professor of mechanical engineering, University of Washington, F. A. Scott, president of the Warner & Swasey Company, Cleveland, and E. R. Fish, vice-president of the Heine Boiler Company, St. Louis; treasurer, W. H. Wiley, president John Wiley & Sons, New York.

AMERICAN ASSOCIATION OF ENGINEERS

The New York Chapter of the Association has elected E. G. Hines as president, D. B. Steinman and Walter E. Brown vice-presidents, Paul S. L. Bolger treasurer and Walter A. Craft secretary.

NEW ENGLAND WATERWORKS ASSOCIATION

The Forty-second National Convention of this association will be held September 18th to 21st at Burlington, Vermont, with headquarters at Hotel Van Ness. There will be an exhibit by manufacturers and dealers in the main dining hall of the hotel and the technical sessions will be held in a room of the same hotel.

The convention will open on Tuesday afternoon with addresses of welcome by Mayor J. Holmes Jackson and by C. S. Ordway, president of the Chamber of Commerce. This will be followed by the presentation of honorary membership to John R. Freeman and the awarding of the Dexter Brackett Memorial Medal. Oliver J. Channing, pumping engineer of Burlington, will describe "The Filtration of Burlington's Water." The election of officers will conclude the session, following which electric cars will be taken to Fort Ethan Allen, where a cavalry drill and concert will be given. In the evening there will be an informal reception and dance.

On Wednesday there will be three sessions for the reading of papers. In the morning "The Public Water Supplies of Vermont" will be the subject of a paper by Charles P. Moat, chemist of the State Board of Health. A paper entitled "The Covering of Open Service Reservoirs in Which Filtered or Ground Waters Are Stored," by George C. Bunker and August G. Nolte, will be presented by Robert Spurr Weston. Allen Hazen will present a paper entitled, "Some Additions to New England Waterworks Plants," and Edwin H. Rogers one entitled "Subsurface Collecting System and Quality of Water of Newton, Mass."

In the afternoon Colonel George A. Johnson will describe "Rapid Sand Filtration at Cambridge, Mass."; Harry U. Fuller, "The Laying of the Sixteen-Inch Cast Iron Water Main Under Portland Harbor"; and Frederic I. Winslow, "The Care of Large Water Sheds."

In the evening "Worcester's Reservoirs, Present and Proposed," will be described by George W. Batchelder; Frank A. Mazzur will discuss "The Selection of Pumping Equipment From the Standpoint of Station Economy"; and Frederick N. Connet will describe "Some Applications of the Venturi Principle."

On Thursday a trip will be made to Ausable Chasm, leaving at 8:30 A. M. and returning to Burlington at 4:30 P. M., the entertainment being by courtesy of the Waterworks Association. Thursday evening will be a superintendents' session, opened by two papers, one entitled "Eliminating Water Hammer From a High Pressure Regulating Valve and Experiences With Universal Pipe on Curves," by Sydney Lee Ruggles, and "Hydrant Connections for Fire Engines," by Frank A. Marston. Following these papers there will be a discussion of practical subjects such as "Standardization of Water Meter Registers," "Use of Brass Pipe for Services," "Protection of Water Mains Crossing Bridges," "Experience With Power Tampers," "Trenching and Backfilling Machines," etc.

Friday will be Manufacturers' Day and in the morning "The Manufacture of Wrought Iron Pipe" will be described by A. A. Gatheman; "Testing, Maintenance and Operation of Large Gate Valves," by Payne Dean; "Records of Stream Flow, Their Use and the Best Methods of Obtaining Them for Municipal and Industrial Purposes," by C. C. Covert; and "Latest Developments in the Chlorine Control Apparatus for the Sterilization of Water Supplies," by Gilbert H. Pratt. In the afternoon, "Some Recent Developments in Steel Pipe" will be described by H. T. Miller. The convention will conclude with the reports of the secretary, treasurer and editor and the president's address.

During the convention there will be entertainments for the ladies and also a golf tournament will be conducted on each day except Thursday.

ASPHALT PAVING CONFERENCE

About 150 public officials, engineers, contractors and material men from fifteen western states attended, on August 21st and 22nd, the Second Annual Paving Conference held at Denver, Colo., under the auspices of the Asphalt Association, the first having been held last year in Atlanta. The conference was opened by Joseph R. Draney, president of the Asphalt Association.

Among the papers and discussion were the following: "The Trend of Specifications and Design of Base and Wearing Courses," by Fred G. Simmons, state highway engineer of Oklahoma; "Asphalt as a Paving Material," by John B. Hittell of Chicago; "Black Base," by Chris P. Jensen, county surveyor of Fresno, California; "Asphalt Paving Adjacent to and Between Car Tracks," by John A. Griffin, city engineer of Los Angeles, California; "Development of Colorado Roads," by E. A. Ammons, former governor of Colorado. Roy M. Green, president of the Western Laboratories, discussed "Various Types of Asphalt Pavement and the Use of Local Materials." J. E. Pennybacker, secretary of the Asphalt Association, outlined "Means of Determining How Much Money Should Be Spent on a Given Road." State highway engineer Borden of Nevada was one of the principal speakers on the subject of "Improvements for Secondary Highways." "The Effects of Alkali Soils and Waters on Cement, Asphalt and Other Road Materials" was discussed by G. W. Craig, manager of the Middle Western Branch of the Asphalt Association and by Dr. S. H. Diggs of Casper, Wyoming, chief research chemist of the Mid-West Refining Company.

So successful were this conference and the previous one that it was decided to hold them annually. The place for the next one will be decided within the next few months.

AMERICAN WATER WORKS ASS'N.—NEW YORK SECTION

At a recent meeting of the Board of Governors of the New York Section, American Water Works Ass'n, this being an organization meeting, Charles R. Bettes, Ch. Engr., Queens C. Water Co. Far Rockaway, N. Y., was elected President and Burt B. Hodgman Secretary.

AMERICAN ROADBUILDERS ASSOCIATION

Plans for the 1924 convention and road show of the American Roadbuilders Association have been practically completed. The date is the week beginning January 14th, convention headquarters being at the Congress Hotel, Chicago, and the road show in the Coliseum and the adjoining Greer Building. President Page has appointed Charles M. Upham manager of the convention and road show, who will report directly to the executive committee of the American Roadbuilders Association. S. F. Beatty, president of the Highway Industries Exhibitors Association, has advised Mr. Page and Mr. Upham that that organization will cooperate in every possible way to make the road show successful.

PERSONALS

Nevin, James R., formerly with Harness Brothers, Contractors, has been appointed junior highway engineer by the Illinois State Highway Commission.

Reid, John W., who has been connected with the Department of Public Works of Detroit, Michigan, for 23 years, has been appointed Commissioner of Public Works for that city, former Commissioner Joseph A. Martin having resigned.

Causey, Lieut. Col. William B., technical advisor to Austria since 1919, has been appointed city manager of Norfolk, Va., at a salary of $20,000.

Weller, W. Earl, city engineer of Binghamton, N. Y., has been engaged by the Bureau of Municipal Research of Rochester to compile data on municipal projects.

Stann, Norman L., chief engineer of the Department of Wharves, Docks and Ferries of Philadelphia, has retired on a pension after 27 years in the service of that city.

Norton, George H., for the past 14 years city engineer of Buffalo, N. Y., has been appointed chief engineer of the Consolidated Terminal and Grade Crossing Commission of that city.

Babcock, Colonel Charles E. P., formerly first assistant engineer of Buffalo, has succeeded Major Norton as city engineer of that city.

Borden, George W., state highway engineer of Nevada, has been elected secretary of the Western Association of State Highway officials.

Green, H. W., formerly sanitary engineer with the International Health Board of the Rockefeller Foundation, has become director of the Bureau of Statistics and Research for the Cuyahoga County, Ohio, Public Health Association.

Manley, J. C., has resigned the position of city engineer of Tacoma, Washington, on account of ill health.

Russell, George F., superintendent of Public Utilities of Seattle, Washington, has succeeded L. B. Youngs, recently deceased, as superintendent of the Water Department.

Barlow, James E., has resigned as city manager of New London, Conn.

Rankin, C. R., assistant city engineer of San Francisco, has been placed in charge for the city of the construction of the conduit to be used for bringing an additional water supply to San Francisco.

Locke, Fred H., has been appointed manager of Grand Rapids, Mich., for the sixth consecutive time.

Rinkliff, George L., formerly manager of Hampton, Va., assumed the duties of city manager of Brunswick, Ga., on July 1.

McFarland, M. F., has been appointed city manager of Norman, Okla.

NEW CATALOGS

(If you want any of these catalogs send the number with your name and address to PUBLIC WORKS and it will be sent to you promptly without charge or obligation.)

ROAD-BUILDING MACHINERY

617. "Good Roads from Rocky Fields" describing stone crushers and crusher outfits made by the United Iron Works, Inc., Kansas City, Mo. 28 pages, 10x6½.

INTERNAL COMBUSTION ENGINES

618. Reprint by the Worthington Pump & Machinery Corporation of New York City of paper before New England Waterworks Association by Dr. Charles E. Lucke, entitled "The Diesel Oil Engine for Waterworks Service." 45 pages, 6x9.

DIAPHRAGM PUMPS

619. Hand and power trench pumps, bilge pumps and diaphragms therefor described by Edson Manufacturing Corporation, Boston, Mass. 18 pages, 6x9.

USE OF EXPLOSIVES

620. The Atlas PowderCompany, Wilmington, Delaware, publishes two 4-page leaflets entitled "Move Your Oldest Stock First," and "Small Diameter Dynamite Cartridges Inferior." 3¼x6.

BUCYRUS ROLLERS

621. Catalogue of Bucyrus Road Machinery Company, Bucyrus, Ohio, describing steam and motor rollers, with specifications and details. 22 pages, 8x11.

SEWAGE BED CONTROLS

622. Catalogue No. 24 of Pacific Flush Tank Company, Chicago and New York, describing automatic controls for operating sand filters and contact beds, including the Miller-Adams air lock feed and the Miller timed siphon for contact bed control. 32 pages, 6x9.

CRANES

623. Elaborate catalogue profusely illustrated with colored plates describing rail, traction and crawling locomotive cranes; wrecking cranes; gantry cranes; crane pile drivers, steam pile hammers, grab buckets, etc. Manufactured by Industrial Works, Bay City, Michigan, commemorating the fiftieth anniversary of the establishment. 162 pages, 8x11.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

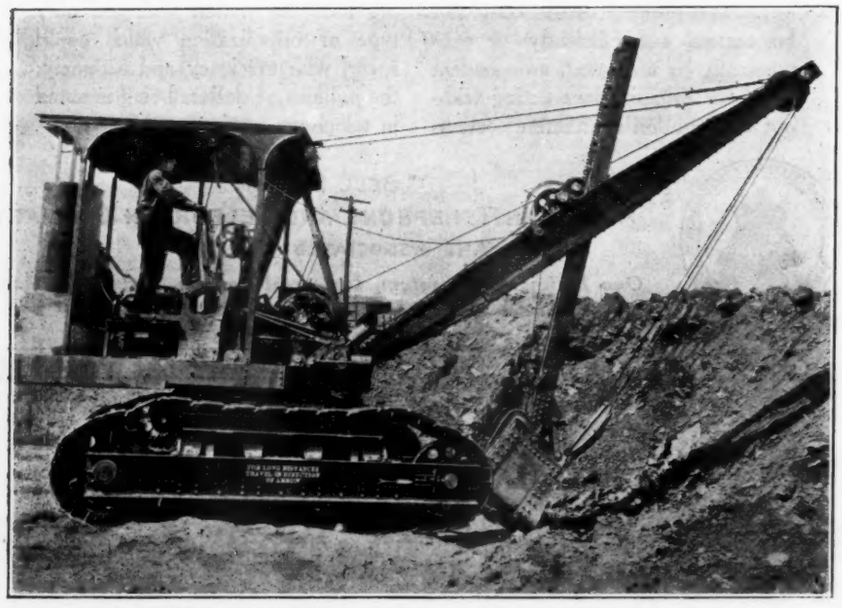
NEW GASOLINE DIPPER SHOVEL

The Orton & Steinbrenner Company of Chicago announces a gasoline driven power shovel operated entirely with gears and shafts. Efforts to substitute gasoline for steam in driving shovels have encountered the difficulty of providing an arrangement to take the place of the independent source of power for the reversible crowding motion of the dipper stick. With the steam operated type this is accomplished by means of a small steam engine geared directly to the dipper shaft but with the gasoline type this was not feasible. This company, believing that sprocket and chain arrangement and wire rope drives would prove only makeshifts, with loss of power and frequent breakage, has developed a positive gear drive which is simple, with few parts. At the bottom of the boom connection is a shaft carrying double steel bevelled gears and bronze friction clutches. This shaft is concentric with the pivot of the boom and therefore not affected by its position. Along the boom is a steel shaft carrying two bevel pinions, one meshing at the bottom with the gears on the horizontal shaft and the other at the top with gears on a countershaft located about half-way up the boom. This latter shaft carries a brake and "slip" friction," and is geared directly to the cast steel rack on the dipper stick. This permits the use of a minimum number of levers.

The hoisting mechanism is rugged and simple in construction, being the same as used in the locomotive cranes built by this company for fifteen years. Power is supplied by a heavy duty 4-cylinder Climax motor with extremely moderate operating cost.

The machine is carried on flexible crawling treads, each of which may be operated independently or both may act together, by means of two brake wheels on the main horizontal shaft; the mechanical differential arrangement being exactly similar to that used on automobiles.

The shovel may be used as a crane by simply taking off the shovel boom and attaching the crane boom; the crowding frictions for operating the dipper being carried by the shovel boom are removed with it. With the crane boom attached, any of the various types of buckets can be used, such as clamshell, drag-line, skimmer scoop, etc. Pile driver leads may be swung from the tip of the boom.

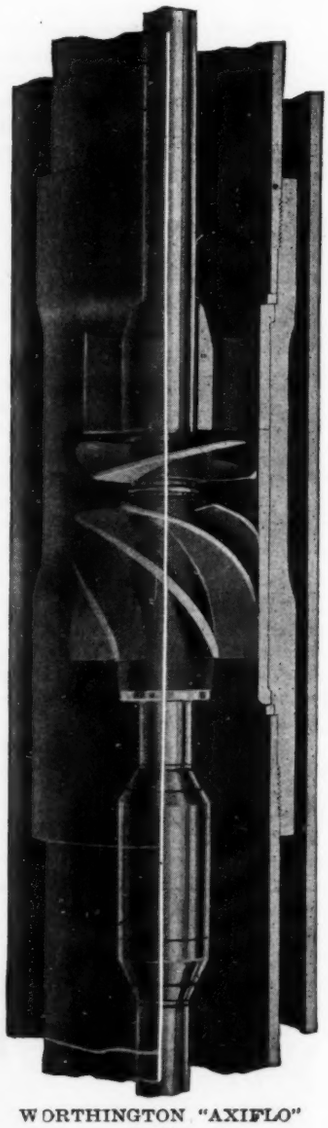


ORTON & STEINBRENNER NEW DIPPER SHOVEL.

NEW TYPE OF DEEP WELL PUMP

A new type of deep well pump has recently been perfected by the Worthington Pump & Machinery Corporation which operates on a principle not heretofore used in pumps of this kind, to which they have given the name "axiflo." The pump is of the rotary class but the impeller is not of the conventional type but is very similar to that employed for propelling ships. The illustration shows one set of discharge vanes, the impeller, the shaft, the shaft coupling and the bearing. In comparatively shallow wells one set of impellers may suffice but in very deep wells a number are necessary, placed one under the other, thereby making the pump equivalent to a 2-stage or other multi-stage pump. Where the water is to be elevated to a considerable height above the ground level, a centrifugal booster pump is added, being connected on to the pump shaft at the ground level. This combination gives one compact unit for both deep well and surface pumping.

The impellers are made of hard bronze capable of withstanding cor-



WORTHINGTON "AXIFLO" PUMP.

rosive action of ground water. The number and angle of the impeller blades, their width and thickness, vary with the conditions and the capacity and efficiency desired. The discharge vanes, shown above the impeller in the illustration, receive water from the impeller and convert the velocity of flow into pressure and cause the water to flow upward smoothly along the axis of the pump, eliminating eddy currents and the accompanying waste of energy. The shaft is of nickel steel and is divided into easily handled lengths, coupled together by long steel couplings.

The weight of the moving parts and the water column thrust are taken up in a specially designed 3-plate self-adjusting bearing, which runs submerged in oil.

The advantages claimed for the pump are that it has double the capacity of any other type of deep well pump (excepting the air lift), using a given size casing, and three to six times the capacity of a 2-plunger reciprocating pump in the same size of well; that it has high efficiency and low operating cost; is compact and practicable for wells too small for a centrifugal pump; is very simple, having only one moving part, and is therefore long-lived; that the flow is continuous and free from pulsations; that the load on the driver is uniform and the operation quiet. The foundation is inexpensive. It is operated by a direct motor drive. The installation cost on the basis of capacity is low and fewer wells are required.

SMALL PORTABLE PUMPING ENGINE

"The Barton Portable Pump" is the name given to a small pump built by the American Steam Pump Company of Battle Creek and adopted by the Barton Products Company of Jackson, Michigan, for attachment to the front of a Ford car, the crankshaft engaging in the pump shaft for operating the pump. The weight of the pump is carried on the frame of the car by means of simple connections. The first installation of the pump on the front of the car requires about an hour and a half, but thereafter the pump may be attached or removed in two minutes; or it can be left on while driving with no danger of straining the car.

BARTON PUMP AS FIRE ENGINE.

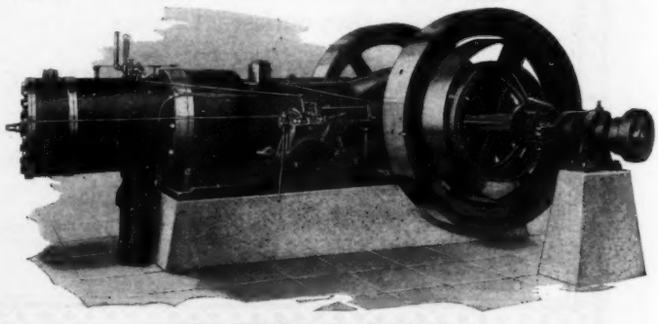
The pump has a normal capacity of 200 to 250 gallons per minute at 20 pounds pressure when the engine is running at a driving speed of 18 miles an hour. A 3-inch suction hose is used and a 2½-inch discharge opening. This pumper is especially adapted for pumping water containing gravel and mud such as that in a sewer or waterworks trench or other excavation. It can be used to throw a stream for fire protection, developing 50 pounds pressure at the discharge nozzle by accelerating the motor.

PRIMM OIL ENGINE

The Power Manufacturing Company of Marion, Ohio, manufactures heavy duty oil engines under the name of the "Primm" engines. The C. B. U. engine is of the 2-cycle, cross head, enclosed crankcase type, employing a combination of the splash system and force feed lubrication. It has been especially designed for heavy duty such as machine shops, irrigation, etc. Ignition when starting is obtained by means of the hot plug, and after a few revolutions is maintained by means of a specially designed hot compensator aided by the heat of compression. The E. B. U. oil engine is essentially the same as the other in working principle but has been especially designed for electrical work and other duty requiring close regulation and steady operation. The company's special electric type engine governor is claimed to regulate the speed within 2 per cent. either way from normal between no load and full load.

A special feature of the Primm engine is a spray plug, the valve of which is so designed that it is opened by the pressure in the oil line caused by each stroke of the fuel injection pump, allowing the oil to be injected into the cylinder under high pressure, the valve being closed by a spring at the end of each pump stroke as soon as the pressure decreases, being seated in such manner that there is no after drip, thus eliminating after burning and consequent heating of the engine. The spray nozzle has six spray holes, thus distributing the injected oil all over the ignition surface of the heat compensator and thoroughly mixing it with the air.

The twin cylinder heavy duty engines are made in three sizes—200, 250 and 300-horsepower, while the single-cylinder engines are built in sizes of from 20 to 150-horsepower. The 200-horsepower engine has a 75-inch flywheel and occupies 107x190 inches of floor space, while the 300-horsepower has 76-inch flywheel and occupies 125x202 inches of floor space.



THE PRIMM OIL ENGINE.

METER TEST VALVE

A valve used for testing the accuracy of meters has been designed and patented by J. D. Smith, superintendent of waterworks of Cheraw, S. C. This permits the comparison of a service meter with a test meter without the removal of the former. The valve is installed permanently as a part of the house plumbing and permits the attachment of the test meter and turning the water through it at any time with very little trouble. It can also be used as a drain for the house plumbing when the water is shut off.

INTERNATIONAL EARTH BORING MACHINE

The Four-Wheel Drive Auto Company, Clintonville, Wisconsin, has just secured from the International Earth Boring Machine Company the exclusive rights to the sale of the International Earth Boring Machine.

This machine will be sold as extra equipment and when attached to the F. W. D. truck is especially adapted for digging pole holes. The power for operation is supplied from the truck by means of a power takeoff shaft. The engine develops sufficient power to carry any excess load caused by the auger wherever extreme soil conditions may be encountered. The boring machine is so attached that it is possible to bore holes on either side or at the rear of the truck, or at an inclination with the vertical. Standard machines will bore holes from 2 to 30 inches in diameter and up to 8 feet deep, while for greater depth extensions of auger shafts are employed. The machine can be quickly detached from the truck. In addition to dig-

ging the holes, the machine raises and sets the poles, requiring an average of only 8 minutes to dig a hole and set a 45-foot pole. The small turning radius and great power of the F. W. D. truck allow it to get in and out of road ditches and crowded alleys where telephones and telegraph lines are usually built.

20-B GASOLINE BUCYRUS SHOVEL

The Bucyrus Company of South Milwaukee, Wisconsin, has just announced a new ¾-yard gasoline revolving shovel known as the "20-B," which contains the same features peculiar to their 30-B machine put on the market last year. Like the 30-B, the unique feature of this shovel is the rope thrust, patents on which are held by the Bucyrus Company. This arrangement not only does away with the necessity of engines, gears, clutches, chains or complicated shafting on the boom, but also provides a more powerful thrust than can be obtained with a steam shovel of the same size.

Briefly stated, the shovel is driven by a single, rugged, slow-speed gasoline engine, the motions of the dipper handle being controlled by a small drum on a shaft under the boom, which shaft has keyed to it pinions for engaging with the racks on the handle. The drum is turned either way by two ropes wound around the drum in opposite directions and leading to drums in the main machine. The operator can control the motions of the dipper perfectly, even to shaking it to relieve it of sticky material.

The shovel may also be had with high lift or extra high lift booms, or with dragline, clamshell excavator or crane attachments. Clutches are sufficiently large to prevent burning. The caterpillars and frame are the same as for the 20-B steam machine.

BUCYRUS 20-B HIGH-LIFT GASOLINE SHOVEL.

BROWNHOIST STORAGE BIN

The Brown Hoisting Machinery Company of Cleveland has designed a combination steel and wood storage bin that can be erected anywhere quickly and economically. The plan of the company is to furnish all the steel parts cut and drilled, including gates, bolts, nuts and washers. It also furnishes detail blueprints with full instructions for erecting the supporting framework, with a complete list of the lumber required, which can be obtained from any local dealer.

The bin is designed and sold on the unit plan, each unit being one panel in length and a purchaser can buy any number of panels according to the storage capacity desired, or can increase the capacity at any time by adding more panels.

The bin is made with a bottom of parabolic shape, which is the most economical type for construction and is said to require less material than any other type having the same capacity and strength. It will hold to its full capacity with ample factor of safety, any material weighing not more than 100 pounds per cubic foot. The bin is supported in steel straps so that the entire load is carried in tension by these. These straps are supported from the frame and are lined on the inside with 2x4 wood pieces laid lengthwise and held in place by an inside steel strap. This wood lining is the only wearing part and any part can be replaced without disturbing the rest of the bin. There are no rivets to drive and no heavy pieces to handle. The entire work is bolted together and can be taken down and set up again without damaging any member. Partitions or bulkheads can be put in at any point, steel channels bent to the proper parabolic shape to fit the inside of the bunker being furnished by the company, the partitions being made up of wooden planks. An opening is left at the bottom for the gate and a cast iron chute is dropped into this opening.

The bins are made in different sizes but the standard which is carried in stock is known as "No. 10," which is 10 feet wide from center to center of post with a panel 7 feet 9 inches long and a maximum depth of 7 feet 3

BROWNHOIST BINS.

inches, with a capacity of 360 cubic feet or 18 tons of material weighing 100 pounds per cubic foot.

JAEGER CONCRETE MIXER

The Jaeger Machine Company is now producing a 14-L concrete mixer, with a capacity of 14 cubic feet of concrete per batch, built on the same lines as the other Jaeger models. This model has been given a thorough workout under severe conditions of service for more than a year before being adopted as a standard Jaeger unit.

The drum is the standard tilting type of this company, 52 inches diameter and 44 inches deep. The engine is a 4-cylinder, 15-horsepower type, built for heavy duty. The loader bucket is large and easy to load and unloads without pounding, and its operation is perfectly controlled by brakes.

The company also builds a 14-P Jaeger paver having many of the same construction features as the No. 7 Jaeger paver. A complete Fordson 4-cylinder engine with differential gear has been adopted as the power unit for this model. The concrete is distributed by specially designed boom and bucket, the latter being bottom-dump with pivot on one side, permitting the operator to spread the batch as it is being dumped so that little additional spreading is required. The traction of this paver is forward or back, easily controlled by the operator.

MONARCH STUMP PULLER

Monarch Tractors, Inc., of Watertown, Wisconsin, describes as its latest development a self-anchoring stump puller. This device is carried on a 3-wheel chassis, the front wheel being a small diameter castor wheel which permits very short turns. An anchor is pivoted to the frame at the rear and when to be used the anchor blade is lowered to take a bite into the ground. The Ford engine is used for power. By selecting a convenient and advantageous position, a half-acre or more of stump can be cleared at one setting. The machine weighs 5,000 pounds and is 16 feet long, 6 feet wide and 4 feet 3 inches high. It can exert a direct pull of 50,000 lbs.

INDUSTRIAL NOTES

ENGINEERING PRODUCTS CO. AGENTS FOR GRAY TRACTOR

The Gray Tractory Company, Inc., Minneapolis, Minnesota, manufacturers of the Gray Giant Combination Road and Street Maintainer, has arranged with Mr. Arthur A. Prauznitz and associates, doing business under the title of Engineering Products Company, 168 North Michigan avenue, Chicago, Illinois, telephone State 3660, to handle the sales in the states of Indiana, Illinois, Iowa and a part of Michigan. Mr. Prauznitz, who will have Mr. Irving E. Jackson, an experienced salesman of machines for road construction, associated with him, was previously sales manager for the Koppel Industrial Car & Equipment Company, with offices in Chicago.

Since 1909 Mr. Prauznitz has devoted his entire time to the promotion and sale of machinery for good roads construction and his prominence in this field caused him to be invited by the United States Road Congress to talk to the engineers and commissioners at Phoenix, Arizona, on the subject of "Good Road Construction," and his address was exceptionally interesting and educating.

Before agreeing to take the sales agency for the Gray Giant Tractor Mr. Prauznitz first made a very thorough investigation of the machine in order to satisfy himself that it would do the work that was claimed.

GUIDE BOARD RESISTS FIRE

The accompanying illustration shows the results of a disastrous fire in Canaan, N. H., this year in which more than 48 business blocks and dwellings were destroyed. Prominent in the photograph is a guide board in the middle of the conflagration which is seen to be as good as new, not even the lettering having been damaged, although a tree about three feet away was burned almost to the ground. This was a Leb-iron guide board furnished by the Lebanon Machine Company about four years ago. We are indebted to that company for the photograph.

GUIDE BOARD AT CANAAN, N. H., AFTER GREAT FIRE OF 1923.

McCALL-MOORE ENGINEERING COMPANY

This partnership, in existence since 1912, dissolved by mutual consent on September 1st. Mr. McCall will continue in the same general line of business under the firm name of McCall Engineering Company, and Mr. Moore will also continue in business under the firm name of Bart Moore Construction Company

PRICE OF BELT CONVEYOR REDUCED

The Link Belt Company of Chicago advises that it has placed the manufacture of the "Cub" portable loader on a production basis and has reduced the price to $550 from its former price of $700.

OHIO VALLEY ROCK ASPHALT CO.

Ohio Valley Rock Asphalt Company, Inc., is producing Natural Kentucky Rock Asphalt for paving. The general office is located at 1012 Starks Building, Louisville, Kentucky, and the plant is located at Summit. The officers are F. D. Wood, president and general manager; Dover Williams, vice president and general superintendent; S. O. LeSuer, secretary and treasurer, and Rodman Wiley, consulting engineer.

GINSBERG-PENN COMPANY

The Ginsberg-Penn Company, Inc., 50 Church Street, New York, has recently been appointed as exclusive distributors of the entire line of locomotive, auto and truck frames of the Byers Machine Company of Ravenna, Ohio. This is in addition to the other equipment for which they are already agents, which includes Smith concrete mixers, P. & H. shovels, draglines and other equipment, Ord road finishers, Sterling wheelbarrows, etc. The firm consists of Frank I. Ginsberg as president, formerly with R. E. Brooks & Insley, and Hamilton O. Penn, formerly with the T. L. Smith Company of Milwaukee.

WALKER VEHICLE COMPANY

This company, manufacturers of the Walker electric trucks, located in Chicago, has opened a branch office and service station at 314 St. Joseph Street, New Orleans, with Thomas H. Shields as manager. The company is also adding a new factory, a strictly modern and fireproof building 360 feet by 100 feet, to house four new electric heat-treating furnaces and the frame assembly department. This addition plus the new manufacturing facilities of Walker Vehicles, Ltd., of England, will more than double the production this year. Twenty-five Walker electric trucks were recently put into the service of the American Railway Express Co. in San Antonio, Texas.

NEWS OF THE SOCIETIES

CALENDAR

Oct. 16-18—LEAGUE OF KANSAS MUNICIPALITIES. Fifteenth annual convention at Hutchinson, Kans. Secretary, John G. Stutz, Lawrence, Kans.

Oct. 17-20—AMERICAN SOCIETY OF CIVIL ENGINEERS. Fall meeting, Richmond, Va.

Oct. 22-23—OHIO STATE CONFERENCE ON CITY PLANNING. Annual conference at Cincinnati, O. Secretary, Charlotte Rumbold, Chamber of Commerce Bldg., Cleveland, O.

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Atlanta, Ga. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. 13th—15th—CITY MANAGERS ASSOCIATION. Annual convention at Washington, D. C. Secretary, John G. Stutz, Lawrence, Kans.

Nov. 15-17—NATIONAL MUNICIPAL LEAGUE. Twenty-ninth annual meeting, New Willard Hotel, Washington, D. C.

Nov.—OHIO WATER PURIFICATION PLANT OPERATORS. Exact date and place of meeting not yet determined. Secretary, Clarence Bahlman, Cincinnati Filtration Plant, California, O.

Dec. 1-3 — ILLINOIS MUNICIPAL LEAGUE. Annual meeting at Urbana, Ill. Secretary, A. D. McLarty, Urbana, Illinois.

Dec 5-6—NATIONAL RIVERS AND HARBORS CONGRESS. Annual meeting at Washington, D. C. Secretary, S. A. Thompson, 824 Colorado Bldg., Washington, D. C.

Dec. 7-8—NEW JERSEY SANITARY ASSOCIATION. Annual meeting at Lakewood, N. J. Secretary, Edward Guion, M.D., City Hall, Atlantic City, N. J.

Dec. 10-12—AMERICAN ASSOCIATION OF PORT AUTHORITIES. Annual meeting at New Orleans, La. Secretary, Tiley S. McChesney, Court Bldg., New Orleans, La.

Dec. ....—NATIONAL ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at New Orleans.

Jan. 13-19—AMERICAN ROADBUILDERS' ASSOCIATION. The annual convention and National Good Roads Show, Chicago, Ill.

Feb. 25-28—AMERICAN CONCRETE INSTITUTE. Annual convention, Chicago. Secretary, Harvey Whipple, 1807 East Grand Boulevard, Detroit.

THE AMERICAN ROADBUILDERS' ASSOCIATION.

It is certain that the demands for exhibit space at the Road Show to be held in Chicago January 14th to 19th will greatly exceed the space available, and the management announces that each exhibitor will have to trim his display down to his very latest products only. Applications for space must be filed at the office of the Association, 37 West 39th Street, New York City, on or before Oct. 27th, as allotment of space will be made the following week. Applicants must be members of the Highway Industries Exhibitors Association and contributing members of the American Roadbuilders Association. Joint membership may be arranged through S. F. Beatty, president of the Highway Industries Exhibitors Association, 400 North Michigan Boulevard, Chicago.

AMERICAN SOCIETY OF CIVIL ENGINEERS

This society will have an annual election of officers on January 16th, 1924. The official nominees for the offices to be filled are as follows: For president, C. E. Grunsky of San Francisco; for vice-president, Lincoln Bush of New York City and Oscar S. Bowen of Seattle; for directors: District No. 1, Paul G. Brown and Thaddeus Merriman, both of New York City; District No. 4, Robert Farnham of Philadelphia; District No. 6, Arthur O. Ridgway of Denver; District No. 14, Alexander Maitland, Jr., of Kansas City, Missouri; and District No. 15, J. M. Howe of Houston, Texas.

A new local section of the society has been added and its constitution approved by the Board of Direction, this being the Syracuse section, which has elected Louis Mitchell as president and Henry G. Throop as secretary-treasurer. New student chapters have been authorized as follows: College of the City of New York, Syracuse University, University of Alabama, University of Michigan, University of North Dakota and University of Tennessee.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

As a result of the recent election of this society, it has chosen the following officers for the coming year: President, Fred R. Low, New York City; vice-presidents, H. Birchard Taylor, Philadelphia, George I. Rockwood, Worcester, Mass., W. J. Sando, Milwaukee, Wis.; managers, E. O. Eastwood, Seattle, Wash., E. R. Fish, St. Louis, Missouri; F. A. Scott, Cleveland, Ohio; treasurer, William H. Wiley; delegates to American Engineering Council: F. K. Copeland, Chicago, Ill.; J. T. Faig, Cincinnati, Ohio; R. E. Flanders, Springfield, Vt.; Dexter S. Kimball, Ithaca, N. Y.; W. B. Powell, Buffalo, N. Y.; Wm. Schwanhausser, New, York, N. Y.; S. W. Stratton, Cambridge, Mass.; C. C. Thomas, Los Angeles, Cal.; P. F. Walker, Lawrence, Kan.

LEAGUE OF KANSAS MUNICIPALITIES

The fifteenth annual convention of this league will be held in Hutchinson October 16th to 18th, in the city auditorium. The program is based upon the results of a postal card questionnaire sent to officials of all the cities of the state asking what questions should be discussed. Most of the time will be given to discussion in the auditorium and at "round tables."

The first morning session will be devoted to the mayor's welcome, the president's address and the annual report of the secretary-treasurer. In the afternoon will be presented the report on State Municipal Legislation, and papers on "The Need of Zoning Powers" by Walter Thiele of Lawrence, and on "How Zoning Works" by Alton Smith of Wichita, followed by general discussion. In the evening "Delinquent Taxes—Causes, Tax Sales under Present Laws, Effect on City Finances, and Suggested Remedies" will be discussed by Chas. D. Shukers of Independence, E. L. Eaton of Bonner Springs, and C. F. Travelute of Marysville. "Automobile License Tax—Should the Cities Share a Portion of This Tax?" will be discussed by A. H. Strickland of Kansas City. "A Tax on Each Gallon of Gasoline Sold—What Rate Is Feasible?" will be discussed by J. W. Slawson of Osawatomie and H. O. Trinkle of Garden City.

Wednesday morning "Fire Prevention" will be discussed by Elmer C. Scott of Topeka and Geo. T. Mohrbaker of Marysville; "Manufacture of Gas from Oil" by C. W. Arlitt of Austin, Tex.; "Community Recreation and Playground Supervision" by Eugene T. Lies of New York City; "Construction and Operation of Outdoor Swimming Pools" by Alfred MacDonald of Wichita and O. W. Wooden of Cimarron. These will be followed by Round Table discussions on "Gas Rates in Kansas—Cost of Production and Distribution; the Three-part Rate System"; "Graveling and Oiling Streets—Cost, Process, Service"; "Law Enforcement"; "Centralized Purchasing and Budget Making"; and "Budget Making and Accounting."

In the afternoon, previous to a tour of the city, there will be papers on "The City Manager Plan" by F. W. Mangelsdorf of Atchison and Josh Wallace of Winfield; and a round table discussion on "Garbage Collection and Disposal."

Thursday morning "Services of a League of Municipalities and the Work of the Oklahoma League" will be described by Dr. F. F. Blachley of Norman; Dr. L. B. Gloyne of Kansas City will read a paper, "Tourist Camp Construction, Maintenance and Regulation"; and "Rate Making for Municipally Owned Utilities—Making the Plants Stand on Their Own Feet" will be discussed by F. L. Bailey of Coffeyville and Jno. S. Painter of Lincoln Center. There will then be round table discussions on "Paving and Street Improvements—Street and Alley Paving, Sidewalk Repair and Construction, and Resurfacing"; on "Municipal Utility Plant Operation—Water, Light, Transmission Line," and on and by "Mayors," "City Clerks," "Councilmen," "City Attorneys" and "City Engineers."

Thursday afternoon the Committee on Model Traffic Ordinances, Mayor W. F. Jones of Hutchinson, chairman, will present its report. There will also be reports of the seven convention committees, election of officers, and selection of the convention city.

IOWA SECTION AMERICAN WATER-WORKS ASSOCIATION

The ninth annual meeting of this section will be held at Ames and Boone, Iowa, October 24th, 25th and 26th; the first two days being devoted to meetings in Ames and the last day to excursions to the water plants of Ames and of Boone, a complimentary dinner being served at the latter city.

On the afternoon of October 24th, after addresses of welcome, papers will be read as follows: "On the Differentiation of Human and Soil Strains of the Aerogenes Section of the Colon Group of Bacteria," by Dr. Max Levine; "Seasonal Variation in a Well Water Supply," by Dr. Edward Bartow; "Micro-Biology of Activated Sludge," by Dr. A. M. Buswell; "The Geology of Water Supply," by Dr. S. W. Beyer; all of the above authors being connected with the faculty of Iowa State College. These papers will be followed by round-table discussions on "Tastes and Odors from Algae"; "Iron in Water Supplies"; "Water Waste Surveys"; "Casing Troubles in Wells"; "Are Bookkeeping Machines Adapted to Small Waterworks Billing?"; Who Should Maintain Curb Shutoffs?"; "Corrosion of Hydrant Valve Stems"; "Uniform Bookkeeping Methods for Waterworks."

In the evening the program comprises three papers: "Operation Records for Small Waterworks," by Earle L. Waterman; "Supervision of Water Treatment Plants in Michigan," by Major Edward Rich; and "Publicity at the Water Plant," by Jack J. Hinman, Jr.; these authors being connected with the Iowa State Board of Health.

On Thursday morning "The Ames Water Supply" will be described by P. F. Hopkins; "The Iowa State College Water Supply," by C. S. Nichols; "The Boone Water Supply," by C. L. Ehrhart; "Shallow Wells," by Hans V. Pedersen, and "Settling Basin Improvements at Davenport," by William H. Kimball. The remainder of the session will be devoted to a continuation of the round-table discussions and the appointment of committees on nominations, resolutions, and audit.

In the afternoon H. F. Blomquist will read a paper entitled "Financing Watermain Extensions"; Harry J. Corcoran a paper entitled "The Relation of Waterworks to Fire Insurance Rates," and J. B. Trenchard will discuss "Development o fthe Modern Oil Engine." Following this will be reports of committees, election of officers, and new business. The session will conclude with a continuation of the round-table discussion.

In the evening there will be a joint session with the Ames Engineering Society and the Ames Chamber of Commerce in which "Volvox, a Taste-Producing Organism," will be described, as will also "Johnson Well Screens," and a special entertainment will be given by the Ames Engineering Society.

On Friday an inspection will be made of the filter plant of Iowa State College and the water and electric plant of the city of Ames, after which the convention will travel by automobile to Boone and inspect the river station and city station of the Boone waterworks.

All waterworks men and others interested in the topics to be discussed are cordially invited to be present at this convention.

FEDERATED AMERICAN ENGINEERING SOCIETIES

At a meeting of the Executive Board of the American Engineering Council of the Federated American Engineering Societies on October 12th, Mortimer E. Cooley, president of the Council, resigned this position on account of ill health, because of which he has also been granted leave of absence by the University of Michigan, where he is dean of the College of Engineering and Architecture. Dean Cooley became president of the Council about two years ago. It is announced that the Executive Board will call for nominations for Dean Cooley's successor, who will be formally chosen at the annual meeting of the American Council to be held in Washington, D. C., early in January.

INDUSTRIAL NOTES

PAINTING TRAFFIC LINES

A reader of Public Works, having asked us what appliance he could use for painting parking spaces and other traffic lines on roadway pavements, we referred the inquiry to the Tropical Paint & Oil Co. of Cleveland, Ohio, which furnishes paint for this purpose. This company states that the most generally used outfit for this purpose seems to be the Eureka marker made by A. G. Spalding & Brothers and obtainable at any of the stores of that company; except for large cities that can afford the expense of a compressed air outfit.

MICHIGAN OFFICE OF TRUSCON STEEL COMPANY.

On October 1st the Truscon Steel Company moved its Michigan office to 615 Wayne Street, Detroit, where it occupies the entire second floor with a complete service organization, an engineering department and also the general advertising department of the company. This office will furnish complete information, estimates and details on all Truscon steel products.

OIL BURNER MANUFACTURERS FORM AN ASSOCIATION

The American Association of Oil Burner Manufacturers, a national organization of both home and industrial oil burner manufacturers, was recently formed in Chicago. Broadcasting accurate data concerning oil burning and the oil burner industry is one of the Association's principal aims. Wallace C. Capen, Home Appliance Corporation, St. Louis, was elected president, and Leod D. Becker, editor of "Fuel Oil for Heat and Power," Galesburg, Ill., was made acting secretary. Temporary headquarters will be maintained at 518 Bank of Galesburg Building, Galesburg, Illinois, and Room 605, 20 E. Jackson Blvd., Chicago. The Association will gladly answer inquiries from interested individuals or firms concerning all kinds of oil burning.

LINK-BELT COMPANY

The Link-Belt Company of Chicago has purchased the Meese and Gottfried Company of San Francisco, Los Angeles, Seattle and Portland. This will improve the distributing facilities of the Link-Belt Company on the Pacific Coast and give it additional manufacturing facilities. The Meese and Gottfried Company and its predecessors have been manufacturers of power transmission and distributors of conveyors and transmission machinery on the Coast for more than forty years. The new organization will be known as "Link-Belt Meese & Gottfried Company" with headquarters at San Francisco. The officials will be: Charles Piez, chairman of the Board; B. A. Gayman, president; Harold H. Clark, vice-president and sales-manager; Leslie W. Shirley, treasurer, and Richard W. Yerkes, secretary.

The Link-Belt Company has placed its manufacturing plants and warehouses near its markets. The organization now includes two manufacturing plants at Chicago, one at 300 West Pershing Road and one at 1700 South Western Avenue; three in Philadelphia, at 2045 Hunting Park Avenue, at 180 West Duncannon Avenue and one at State Road; two at Indianapolis, at 515 North Holmes Avenue and at 202 South Belmont Avenue; one at San Francisco at 19th & Harrison streets; one at Seattle at 820 First Avenue South; and one at Toronto, Canada, at Wellington & Peter Streets. In addition there are twenty branch sales offices in the principal cities of the country.

WESTON SEWER JOINTS

The city engineer of Hartford, Connecticut, R. N. Clark, writes us that, in laying sewer pipe in that city, "joints made with the Weston patent form were used in wet trenches. Under those conditions we consider them more satisfactory than the ordinary mortar point, more convenient to use on the job than bituminous joints. Prices bid on the few we have considered were about the same as for bituminous joints."

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

BAKER SNOW PLOWS

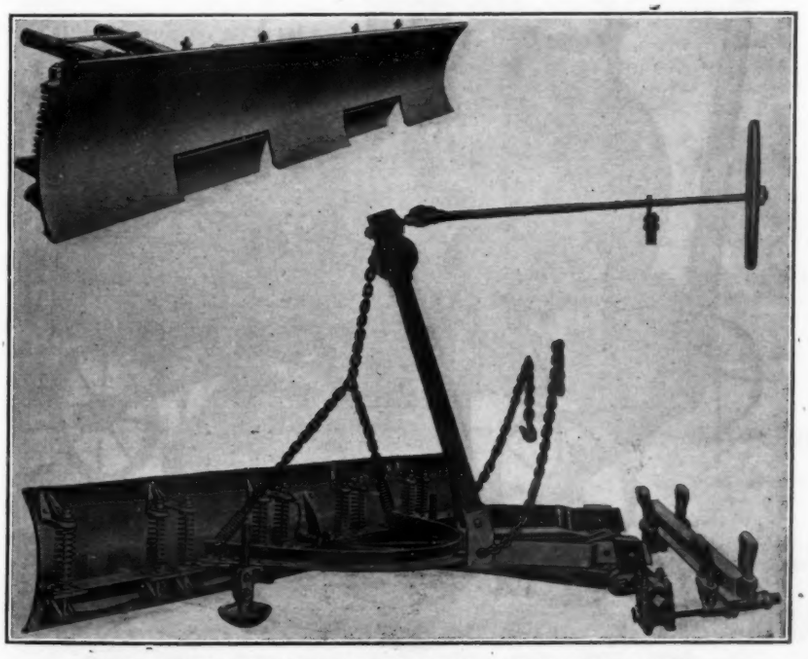
A snow plow to be attached to auto trucks is manufactured by the Baker Manufacturing Company of Springfield, Illinois, which has as its outstanding feature the safety tripping blades. This consists of five or more sectional blades attached to the bottom edge of the main blade by malleable hinges and held in place by strong springs. The sectional blades swing back when they strike an obstacle such as a manhole, street crossing, car track, etc., and snap back to normal position when the obstacle has been passed. These tripping blades are made of cast steel and are 6 inches high.

In addition to this feature, attention is called to the universal axle clamps and the self-locking lifting device. Clamps fitted to the front axle and springs support a sub-axle carrying castings which support the lifting frame of the plow and also take the thrust of the push members. The plow can be attached to practically any motor truck of standard type, special construction being necessary only on 4-wheel drive trucks and others of unusual front end construction.

Lowering or raising of the blade is accomplished by means of a hand wheel located in the cab of the truck. This wheel operates, through a self-locking worm and worm gear, a spool over which the lifting chain winds. The lifting frame can be adjusted backward or forward to clear the bumper or other attachment to the forward end of the truck. With the lifting device the plow can be raised 18 inches off the ground.

In fairly deep snow a speed of 6 to 8 miles an hour can be attained and in lighter snows up to 15 miles an hour. These plows have been known to clear from 25 to 30 miles of road 15 feet wide in a working day.

This snow plow can also be used for shaping up dirt or gravel roads, cleaning hard roads, as a backfiller or a subgrade finisher.



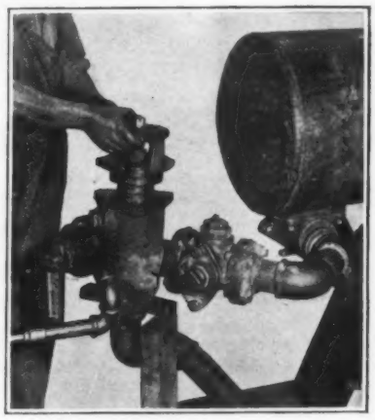
BAKER SNOW PLOW ATTACHMENT, SHOWING SAFETY TIPPING BLADES.

NEW BALANCED VALVE

A new 3-way balanced valve is now being installed as standard equipment on Koehring 21-E pavers which is believed to overcome difficulties found in the old 3-way valve with metal-to-metal seat in which there was often unavoidable leakage when the water used by the contractor contained hard substances. Work on the development of this valve began in 1915 and has only recently been completed.

In this valve there are no metal-to-metal seats and all parts in contact with water are either bronze, brass, rubber or leather, preventing corrosion. The valve is balanced, automatically operated, permanent, non-freezing, self-draining and completely accessible. Rubber valve discs and leather plungers that had been in service several seasons were found in good condition and continued in service. These are standard Jenkins parts carried in any hardware store. The entire unit can be pulled out of the valve body by removing three bolts and one pin connection and can be dropped back into place without any fitting or adjusting. When mounted in the machine the valve and valve parts are protected by a removable housing from stone, sand and cement that may drop from the charging skip.

The valve opens automatically to discharge water into the drum, the time of opening being adjustable. A hand control also is provided.



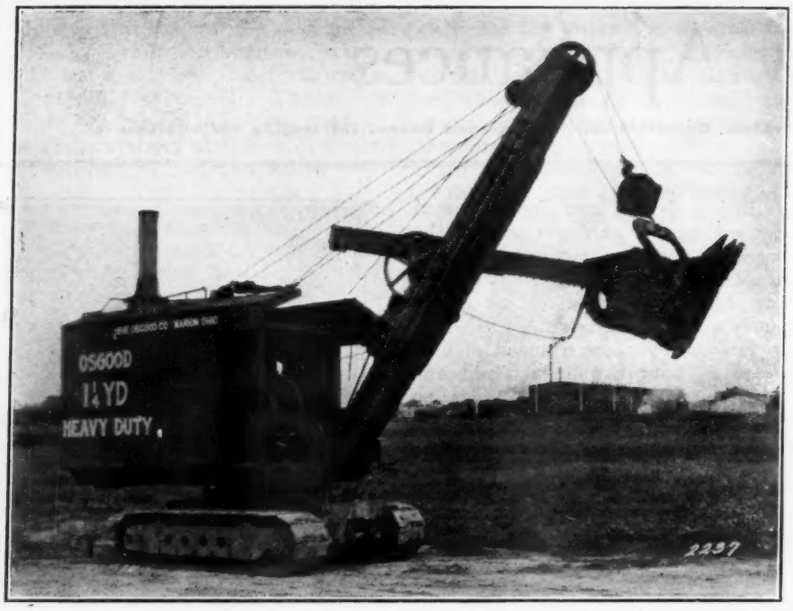
KOEHRING THREE-WAY VALVE.

OSGOOD HEAVY DUTY STEAM SHOVEL

The Osgood Company of Marion, Ohio, announce the addition to their line of revolving steam shovels of a new 1¼-yard heavy-duty shovel of the full revolving type containing the standard Osgood features such as horizontal hoisting engine, submerged tube type vertical boiler, centering gudgeon for connecting main body casting to path gear, simplified continuous tread mounting, power steering on both continuous tread and traction mounting, double geared shipper shaft, and automatic trip rope tension.

The entire machine is designed for heavy work, with over-sized shaftings and large bearing surfaces. The boom and dipper handle are of white oak shrouded with plate steel, the whole securely bolted together forming solid units.

The hoisting and swinging units are assembled on a one-piece, open-hearth steel casting which rotates on conical, manganese steel rollers. The truck frame is a one-piece open-hearth



OSGOOD HEAVY-DUTY SHOVEL.

steel casting machined to take either continuous tread, traction or railroad trucks, all of which are readily interchangeable. The continuous tread mounting is of very simple and compact construction with an all-gear drive, and the number of bearings, gears and other wearing parts reduced to a minimum. Steering is accomplished by a steam ram by means of which one tread belt is held stationary while the other moves, making it possible to turn the machine at right angles if desired.

The machine can be equipped with high-lift boom or trenching dipper and is especially adapted for use with clamshell or dragline bucket or as a crane. The object was to design a machine of the 1¼-yard class suitable for heavy work without sacrificing speed, simplicity or ease of operation. The general design is similar to the Osgood ¾-yard heavy-duty machine.

KENT, JR., BATCH MIXER

A 1-bag batch mixer is produced by the Kent Machine Company of Kent, Ohio, which is called the "Kent Junior" and has a capacity of from 6 to 8½ cubic feet of loose materials. The frame is made of heavy steel channels thoroughly braced. The drum is of heavy steel plates with iron heads and the steel mixing blades and scoops bolted in. The drum is carried on four solid specially hardened wheels whose shafts are carried on bronze bearings. Power is transmitted from the engine by chain and sprockets, the engine being a 3-horsepower gasoline. There is a loading chute of ample size to hold the aggregates, which can be raised to an angle that discharges the materials readily into the drum. An automatic water tank is provided. The weight is 2,250 pounds with power loader or 1,700 pounds without. The magneto of the gasoline engine is guaranteed for five years. There is a large, roomy house over the engine, making all parts accessible. It is said that the cost of operation averages about a cent a cubic yard for gasoline and oil.

KENT, JR., BATCH MIXER.

PERMANENT STREET SIGNS

Municipal signs of all kinds are manufactured by the Century Sign Company of Boston which are claimed to be unusually neat and attractive and of permanent material throughout. The letters are of solid aluminum casting on a background of asbestos, asphaltum and cement hardened under great pressure. The plates carrying the letters are bound together back to back (giving letters on both sides) by ornamental casting and sheet aluminum moldings and the whole is then locked on to the post and cannot be removed.

A NON-FREEZING EXPLOSIVE.

The Atlas Powder Company has placed on the market what is claimed to be the first non-freezing explosive with all the advantages of dynamite. This material, which is called "Ammite," is claimed to possess all the advantages of dynamite in strength, velocity, water-resistance, sensitiveness and stability, with the additional advantages of being non-freezing and of not causing headaches when han-

dled. It also retains these qualities in the heat of summer and may be kept in proper storage indefinitely without the least decrease in strength, sensitiveness or stability. It is graded as to its percentage of strength in the same way as the various forms of dynamite and is made in 30 per cent., 35 per cent., 40 per cent., 50 per cent., 60 per cent. and 75 per cent. grades.

W. & K. STREET SWEEPERS

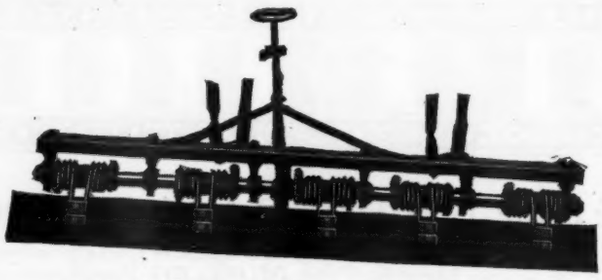
A snow and street brush arranged to be attached to a Fordson tractor is now being made by the Whitehead & Kales Company of Detroit. The manufacturer states that it will handle snow 10 to 12 inches deep as well as being adapted for street cleaning during the warmer months. It is driven direct from the tractor motor and works ahead of the tractor and can thus be manoeuvered by the operator at will.

The brush is supported in front of the Fordson by a channel steel frame. The brush is 6 feet long and, traveling on an angle of 35 degrees, will sweep a width of approximately 5½ feet. A sprocket is located on each end of of the brush, allowing it to be reversed in the frame. It is claimed that this, and the fact that a heavy spring which counterbalances the weight of the brush allows it to rest lightly on the pavement, prolong the life of the brush. Power is taken from the Fordson pulley gear. The brush transmission contains two speeds which, combined with the three forward speeds of the tractor, give a total of six brush speeds.

THE GEOPHONE

The Geophone, an instrument which has been developed by army engineers, was used during the War and is now used by the Bureau of Mines in connection with mine rescue work. It is an exceedingly delicate instrument which operates on the order of the seismograph and will locate the direction of a source of wave motions with great accuracy. These motions may be caused by the striking of earth with a pick or by the escaping of water from a watermain, or by any agency whatever. It is said that the instrument is very sensitive not only to vibration but to variations in vibration, so that with a little experience the cause of the vibration may be determined. It has been used successfully in a number of cases in locating leaks in watermains and services. These machines are manufactured by the Globe Phone Mfg. Company of Reading, Mass., which claims that they are now much more sensitive than those manufactured during the War. The instruments are quoted at $60 an outfit.

COMPLETE GEOPHONE SET.



MICHIGAN ANTI-CHATTER BUMP MACHINE.

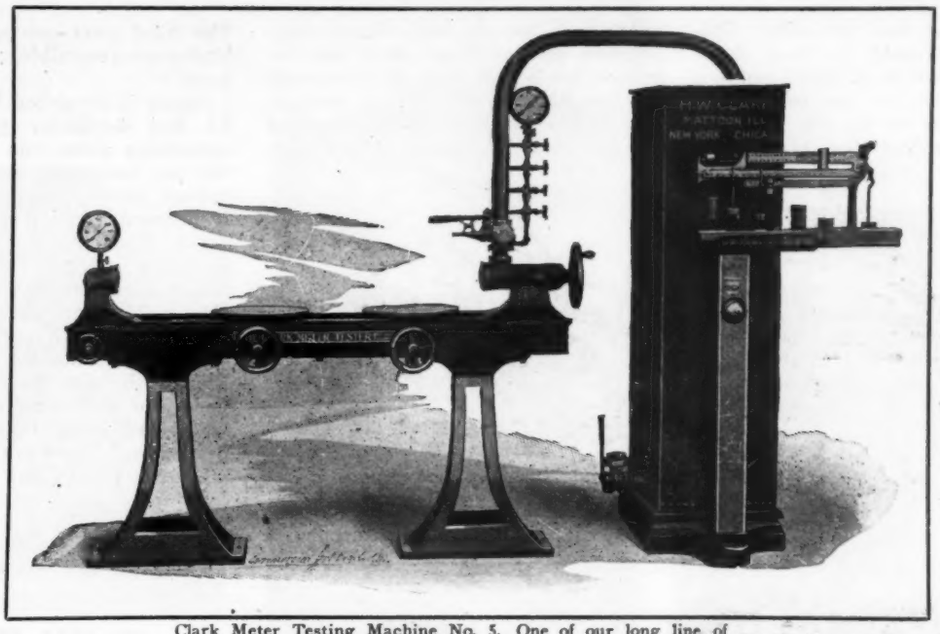
W. & K. STREET AND SNOW BRUSH.

ANTI-CHATTER BUMP MACHINE

The Grand Rapids Road Equipment Company of Grand Rapids, Michigan, manufactures what it calls the "Michigan anti-chatter bump machine," which is a road blade made for attachment to a truck and provided with five double-coil springs. The blade projects out on the right-hand side of the truck, thus gathering the loose gravel and dirt and passing it toward the center of the road. The springs are U-shape and are attached to a sleeve which is in two parts and clamps on to the rocker shaft. Should the spring tension weaken, the sleeves can be loosened and turned on the shaft so as to secure any tension desired. As the blade wears, it can be lowered by loosening the nuts on the clip and it can be adjusted for crowning and decrowning in the same way. The blade is 10 feet long and carries an 8-inch or 10-inch scraper of 5/16-inch highly carbonized steel.

E. B. ROAD MAINTAINER

The Emerson-Brantingham Implement Co., of Rockford, Ill., furnishes a one-man road machine that was developed to maintain non-surfaced

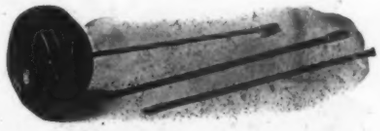


Clark Meter Testing Machine No. 5. One of our long line of machines built to meet every requirement.

CLARK

Meter Testing Machines and Testing Instruments

The Clark Leak Indicator. Furnished in leather case to fit pocket.

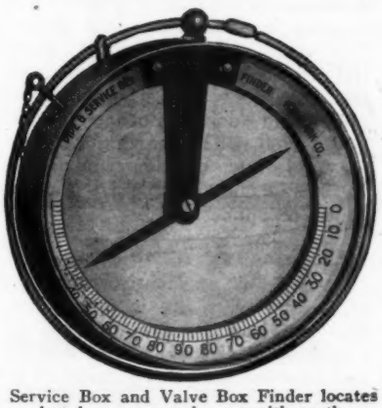


The Clark "Sonofone" for locating small leaks by sound.

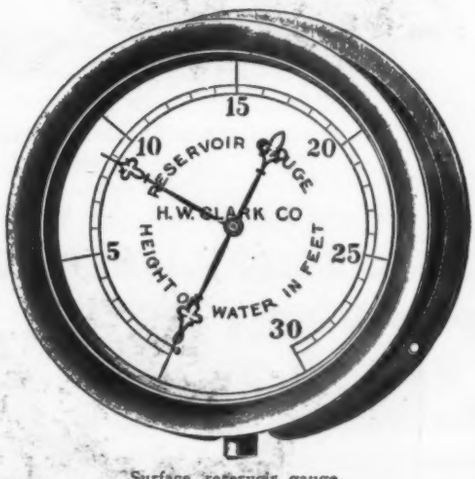
Over thirty years of specializing in the manufacture of meter testing machines and testing and trouble finding instruments has resulted in the Clark line becoming recognized all over the country as the standard of excellence.

In dealing with us you not only have the assurance that comes from years of experience, but the unconditional guarantee that covers all Clark products.

Write us today for information about anything for water works or municipalities.



Service Box and Valve Box Finder locates lost boxes covered over with earth.



Surface reservoir gauge.

Clark Meter Boxes—Southern
Clark Meter Boxes—Northern

Clark Meter Testing Machines—Six Models—Bulletin B.
Clark Testing Instruments Increase Earnings—Bulletin C.
The New C. M. B. Service Box Corrects All Service Box Faults, Valve Boxes, Valve Housings, etc.—Bulletin D.
Water Works Pumps of All Kinds—Bulletin E.
Municipal and Miscellaneous Castings—Bulletin F.
Venturi Meters—Check Your Pumpage and Waste—Bulletin G.
CAST IRON PIPE, FIRE HYDRANTS and VALVES, AIR VALVES, BRASS GOODS, etc.—Bulletin H.

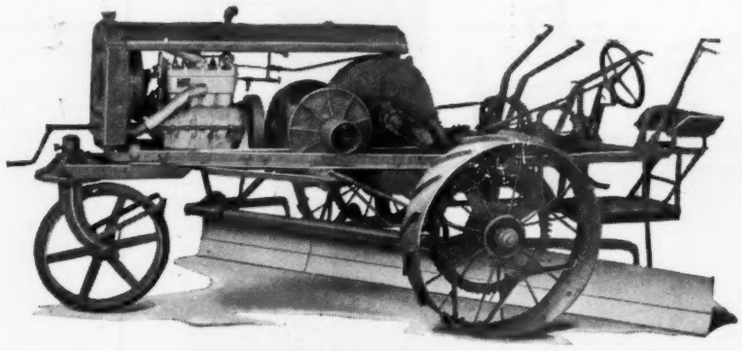
H. W. CLARK COMPANY

Everything for the water works and municipality

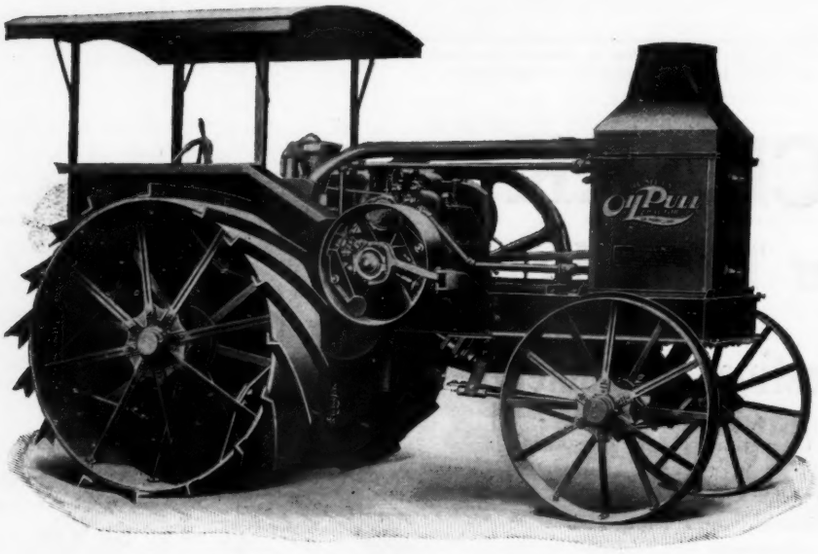
1308 BROADWAY, MATTOON, ILL.

New York Salt Lake City Chicago
Memphis San Francisco Buffalo

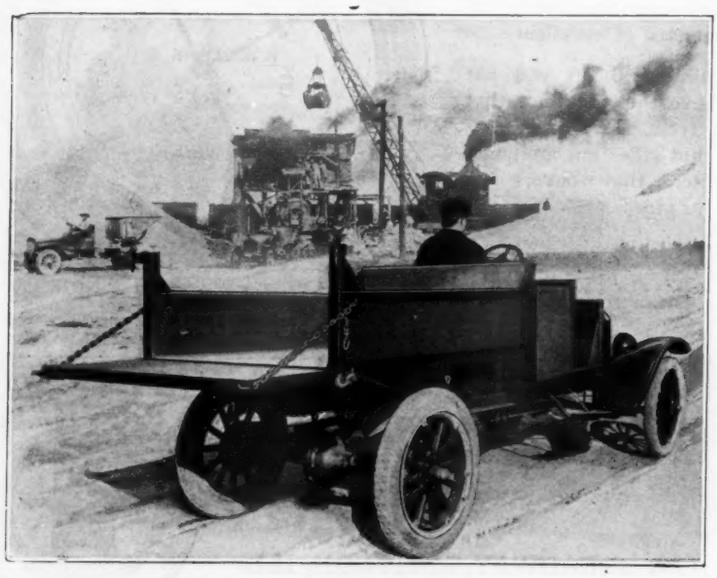
roads at a low cost per mile. The cutting blade is made in three separate sections—two 54-in. pieces and one 24-in.—which can be set to fit any desired contour or to run straight. Four levers adjust the blades for depth and contour, while heavy compression springs drive them into the ground but permit them to lift enough to clean obstructions without damage. The vertical angle of the mold board can be changed by adjusting two bolts.



E. B. ROAD MAINTAINER.



OIL PULL ROAD BUILDING TRACTOR.



"AMERICAN" AUTOMATIC DUMP BODY.

The hard steel cutting edges of the blades are reversible, providing double wear.

Power is furnished by an 8-16 h. p. Le Roi 4-cylinder gasoline engine, consuming about one gallon of gasoline per hour while working. An improved friction transmission provides 18 forward working speeds and 18 reverse. Hyatt roller bearings are used at every point in the transmission where revolving parts carry a load; also in the drive wheels.

By means of a special braking device the maintainer can be turned around sharply, there being a brake pedal for each rear wheel, the drive wheels revolving independently on a dead axle. There are two 52-in. drive wheels and one front wheel. To eliminate side draft resulting from the horizontal angle of the blade, the left wheel may be moved inward, thereby making the line of draft coincide with the load.

OIL PULL TRACTORS

Under the name of "Oil Pull Road Building Tractors" the Advance-Rumely Thresher Company of LaPorte, Indiana, manufactures a tractor which burns all grades of kerosene and, it claims, at lower fuel cost per mile of road built and per horsepower than any other gasoline or kerosene tractor of equal rating. The 16-30 h. p. tractor will pull an 8-foot grader, and the 30-60 tractor a 12-foot grader if equipped with proper engine hitch. The claim for fuel economy is based on a test conducted by Purdue University where a record was made of 0.563 pound of kerosene per horsepower hour.

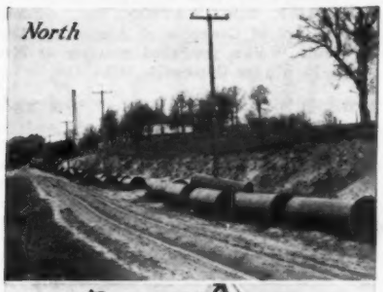
Other advantages are: Oil cooling, insuring no freezing in winter or overheating in summer; motor delivering 25% above its rated power; substantial wheels with lugs to suit various soil conditions; direct connected belt pulley for driving other machines; large front wheels, giving easy steering and light traction, and straight-membered channel iron frame with no bends or splices.

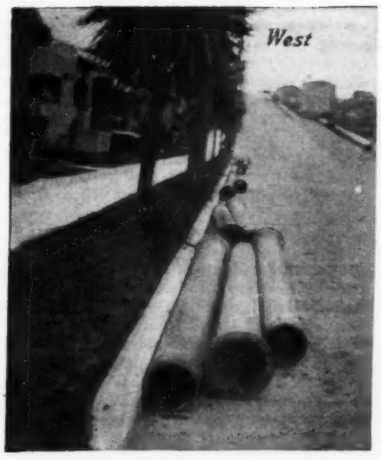
GRAVITY DUMP BODIES

"American" automatic dump bodies of several types are manufactured by the American Production & Trading Company of Chicago. This company's line now includes a full range of gravity bodies, flat type as well as hopper type, ranging in size from 4 yards down to 1 yard and for every make of motor truck. The company claims that 95 per cent. of the work requiring a dump body can be handled by gravity dump with lower initial investment, less dumping time and lower operating cost than with any type requiring power.

These bodies have exclusive features such as double-acting tail gate, double

(*Continued on page* 32)





West—San Francisco, Calif.

East—New Bedford, Mass.

North—St. Paul, Minn.
Central—St. Louis, Mo.
South—New Orleans, La.

Throughout the Length and Breadth of the Land

BELL-and-spigot Cast Iron Pipe is preferred because of its many advantages. It embodies, more than any other pipe, the features most desirable.

Cast Iron Pipe lasts for centuries. Its maintenance cost is extremely low; repairs or connections are easily and quickly made. Its bell-and-spigot joint has proven itself the most satisfactory for water and gas distribution. The work of laying and maintenance is familiar to all gas and water works men, and can be done by the regular maintenance force.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Building, Chicago

CAST IRON PIPE

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems.

"Pipe and the Public Welfare," an illustrated cloth-bound book on underground uses of Cast Iron Pipe, sent postpaid for 25c.

(Continuel from page 30)

spring check chains, double positive locking latches, double rolling dogs, etc.

Flat type bodies are made for light duty speed trucks of 1-ton capacity and for heavy duty trucks of 1½ tons, and up to 4 yards' capacity. One, known as No. 2510, is built especially for Ford 1-ton trucks, with the center of gravity of the truck low and well forward of the rear axle. The standard dumping angle on the flat type bodies is 45 degrees, which is sufficient to cause the body to clean itself on account of the quick dumping action. Extra partitions may be added for dividing the load for several batches.

For sticky material, such as wet mixed concrete and asphalt, the company recommends hopper type bodies. The dual hopper type gives a capacity load for 2-ton trucks. Either 1-yard or 1½-yard bodies if mounted on a motor truck with pneumatic tires makes a fast traveling unit. The "American" automatic hopper end dump body has an automatic latch which positively locks the body in upright position and can be released from the driver's seat. Rolling dogs engage under the crossbar and hold the body upright at four points. A spring shock absorber consists of a chain and compression spring which practically eliminates the jolt as the hopper reaches the end of the rails. The dumping angle is almost vertical, insuring clean dumping of every load.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc., required by the Act of Congress of August 24, 1912, of Public Works, published monthly at New York, N. Y., for October 1, 1923.

State of New York, County of New York, ss.: Before me, a Notary Public in and for the State and county aforesaid, personally appeared James T. Morris, who, having been duly sworn according to law, deposes and says that he is the business manager of Public Works, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and, if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business editor and business managers are:

Publisher—Public Works Journal Corporation, 243 West 39th Street, New York, N. Y.

Editor—A. Prescott Folwell, Montclair, N. J.

Managing Editor—A. Prescott Folwell, Montclair, N. J.

Business Manager—James T. Morris, White Plains, N. Y.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock.)

Public Works Journal Corporation, 243 West 39th Street, New York, N. Y.

Sumner W. Hume, 243 West 39th Street, New York, N. Y.

James T. Morris, White Plains, N. Y.

A. Prescott Folwell, Montclair, N. J.

Contracting Pub. Co., New York, N. Y.

Stockholders of Contracting Publishing Co.:

H. F. Pomeroy, Forest Hills, N. Y.

J. R. Breuchaud, 290 Broadway, N. Y. City.

Frank W. Skinner, 243 West 39th Street, N. Y. City.

H F. Hackedorn, Consumers Bldg., Chicago, Ill.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are:

Swetland Publishing Company, 239 West 39th Street, New York, N. Y.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily publications only.)

JAMES T. MORRIS, Business Manager.

Sworn to and subscribed before me this 4th day of October, 1923.

(Seal) H. H. MINER,
Notary Public, No. 196, New York County.
Register's No. 4001.
(Commission Expires March 30, 1924.)

NEWS OF THE SOCIETIES

CALENDAR

Nov. 12-16—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention, Atlanta, Ga. Secretary, Charles Carroll Brown, St. Petersburg, Fla.

Nov. 13th—15th—CITY MANAGERS ASSOCIATION. Annual convention at Washington, D. C. Secretary, John G. Stutz, Lawrence, Kans.

Nov. 13-15—NORTH CAROLINA SECTION, AMERICAN WATER WORKS ASSOCIATION. Annual meeting at New Bern, N. C. Secretary, Thorndike Saville, Chapel Hill, N. C.

Nov. 15-17—NATIONAL MUNICIPAL LEAGUE. Twenty-ninth annual meeting, New Willard Hotel, Washington, D. C.

Dec. 1-3 — ILLINOIS MUNICIPAL LEAGUE. Annual meeting at Urbana, Ill. Secretary, A. D. McLarty, Urbana, Illinois.

Dec 5-6—NATIONAL RIVERS AND HARBORS CONGRESS. Annual meeting at Washington, D. C. Secretary, S. A. Thompson, 824 Colorado Bldg., Washington, D. C.

Dec. 7-8—NEW JERSEY SANITARY ASSOCIATION. Annual meeting at Lakewood, N. J. Secretary, Edward Guion, M.D., City Hall, Atlantic City, N. J.

Dec. 10-12—AMERICAN ASSOCIATION OF PORT AUTHORITIES. Annual meeting at New Orleans. La. Secretary, Tiley S. McChesney, Court Bldg., New Orleans, La.

Dec. ....—NATIONAL ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at New Orleans.

Jan. 13-19—AMERICAN ROADBUILDERS' ASSOCIATION. The annual convention and National Good Roads Show, Chicago, Ill.

Jan. 17—ASSOCIATED GENERAL CONTRACTORS AND AMERICAN ROAD BUILDERS' ASSOCIATION. Joint meeting in Chicago.

Feb. 25-28—AMERICAN CONCRETE INSTITUTE. Annual convention, Chicago. Secretary, Harvey Whipple, 1807 East Grand Boulevard, Detroit.

AMERICAN WATERWORKS ASSOCIATION—NORTH CAROLINA SECTION

This section will hold its annual meeting at New Bern, North Carolina, November 13th, 14th and 15th. Meetings will be held at the Courthouse and a large space will be available for exhibits. The first feature will be a complimentary supper by the Kiwanis and Rotary clubs on Tuesday evening. Wednesday morning there will be a business meeting with election of officers, choice of the next convention city and appointment of committees. J. O. Craig of Salisbury will read a paper entitled "Who Shall Pay for Metering Services?"; "Fire Protection" will be discussed by Sherwood Brockwell, deputy insurance commissioner, of Raleigh; and McKearn Maffitt of Wilmington will discuss "Cross Connections Between Public and Private Water Supplies."

Wednesday afternoon, following a barbecue, F. G. Godfroy will describe "The Water Supply at New Bern Fire"; J. W. Kellogg of the State Board of Health will read a paper entitled "Algae and Their Relation to Water Supplies," which will be discussed by H. L. Shaner and others. "Stream Flow Records for Waterworks" will be read by W. E. Hall of the U. S. Geological Survey and discussed by Thorndike Saville and others. Wednesday evening W. M. Turner of Wilson will read a paper entitled "Filter Operation" and another describing "The Henderson Water Supply," illustrated with lantern slides, will be read by Stanley Wright.

On Thursday morning a paper on "Dry Feed of Chemicals" will be read by J. C. Michie of Durham; one on "The Direct Oxidation Process of Sewage Treatment" by H. L. Shaner of Winston-Salem; one on "Accurate Control of an Old Filter Plant" by E. G. McConnell of Charlotte; and one on "The Use and Handiing of Chlorinators" by a representative of Wallace & Tiernan.

In the afternoon, following an oyster roast, S. G. Lantz of the Darlington Manufacturing Company will read a paper entitled "Use and Abuse of Fire Hydrants"; A. U. True of Proximity a paper on "Need of Wash Water Tanks"; and "The Drilling, Care and Operation of Deep Wells" will be discussed by a representative of a well machinery company. The convention will conclude with a boat ride on the Neuse river.

JOINT MEETING OF GENERAL CONTRACTORS AND ROADBUILDERS

A joint meeting of the Associated General Contractors and the American Roadbuilders Association will be held in Chicago on Thursday, January 17th, to discuss various matters of importance to the members of both organizations. The American Roadbuilders Association will hold its convention in Chicago from January 15th to 18th, inclusive, while the Associated General Contractors will meet on the 21st to 23rd. The joint meeting is therefore calculated to be convenient for the members of both organizations, especially so as all of the officers, the executive committee and the heads of the 28 chapters of the Associated General Contractors will be in Chicago during the week of the Roadbuilders convention and it is expected that many of the members of this organization will be attending that convention.

NATIONAL MUNICIPAL LEAGUE

The 29th annual meeting of the National Municipal League will be held in Washington, D. C., November 15th to 17th. At the same city, on November 13th to 15th, the City Managers Association will have its annual meeting, on November 14th to 16th the Governmental Research Conference will meet, and on the 15th to 17th the National Association of Civic Secretaries.

The Commissioners of the District of Columbia have prepared trips of inspection for the City Managers Association and the National Municipal League for the 13th, 14th and 15th, for inspecting trees and streets, lights, refuse, charities, water supplies, markets and wharves, bridges, parks, schools, workhouse and reformatory, the sewer, police and fire departments, hospitals, etc.

On Thursday the subject, "Can Tests of Good Government Be Developed?—The Next Step in Budget Making; The Fundamentals of Municipal Accounting," will be discussed, following reports of committees on the subject. At luncheon a discussion on "Municipal Operation of Public Utilities," held jointly with the Governmental Research Conference, will be led by Henry J. Steffens, Jr. There will be an informal dinner jointly with the City Managers Association, at which George W. Wickersham will speak on "A Generation's Progress in Municipal Government"; and A. R. Hatton and E. C. Hopwood will discuss the subject of "Cleveland's First P. R. Election."

Friday morning will be devoted to "The Problem of Modern Street Pavements." Thomas H. MacDonald and J. F. Pennybacker will speak on "A Sound Policy for Financing Street Pavements"; J. H. Neeson and R. C. Cram will speak on "The Administration of Street Pavement Within the Railway Area"; following which there will be a discussion by M. O. Eldridge, Col. Charles Keller, H. G. Perrin, C. M. Pinckney and Julius Adler. The subject for the luncheon discussion will be "Consolidated Government for Metropolitan Areas," at which Louis Brownlow will present "The Advantages of Freedom from Overlapping Jurisdictions," Arthur E. Nelson will discuss "County Government and a Large City," and Dr. A. R. Hatton will describe "Complete Consolidation in Butte, Montana." Following an automobile tour in the afternoon, the annual business meeting will be held at 5 P. M., followed by the meeting of the Council.

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS

The 29th annual convention of this society is to be held at Hotel Ansley, Atlanta, Georgia, November 12th to 16th. The afternoon of the 12th will be occupied with meetings of committees on specifications for brick pavements, for subgrades and foundations, stone block pavements, cement concrete pavements, sewers, sidewalks and curbs, street railway pavements and track construction, and wood block pavements. In the evening the committee on bituminous pavements will meet and sectional meetings of the

society will discuss proposed new specifications and changes in specifications presented by the committees. At 9 o'clock that evening there will be a meeting of the executive committee.

Tuesday morning the convention will open with addresses of welcome and responses and the president's address. Reports will be read by the executive committee, the secretary, the treasurer and the finance committee. The convention will select committees on nominations, place of meeting, and resolutions, and conduct any other business brought forward. Reports will then be read by the committee on public safety and that on public welfare.

In the afternoon George W. Fuller will present the report of the committee on waterworks; John R. Baylis will read a paper entitled, "Let Us Have More Palatable Water"; and J. R. McClinton one describing "The New Water Supply Works at Memphis." "Possible Causes of Failure of Cement Concrete Pipe Used for Underdrains in Sand Filters at Worcester, Massachusetts," will be discussed by Harrison P. Eddy. George H. Norton will present the report of the committee on street maintenance, street cleaning and snow removal, and Ralph Toenofeldt the report of the committee on street lighting. A paper entitled "Street Lighting" will be presented by L. A. S. Wood and one entitled, "The Why and How of Street Lighting," by Stephen Carleton Rogers. Members are requested to be prepared to discuss, following these papers, the subjects of municipal ownership and operation of electric light plants, and street lighting distribution with purchased current.

Wednesday morning a paper entitled "Public Service Utilities" will be read by J. D. Bowles; one entitled "Transportation Problems," by J. D. McCartney. "Motion Pictures of the Invisible" will then be shown by a representative of the Picture Service Corporation. The remainder of the day will be occupied with an automobile ride and dinner at the Country Club.

Thursday morning E. R. Conant will present the report of the committee on street paving and street design. A paper on "Widening of Highway Curves" will be presented by G. A. Crayton; one on "Roadway Widths as Related to Traffic," by L. R. Ash; "Methods of Highway Construction in Georgia," by W. R. Neal; "Relation of Depth of Foundations to Their Strength," by Clarence D. Pollock; "Some Details in Street Design," by P. L. Brockway; "Modern Construction of Brick Pavements and Why," by Will P. Blair; and "Lime Rock Asphalts of the South," by E. A. Kingsley.

On Thursday afternoon reports will be presented by the following committees: Specifications for bituminous pavements; specifications for brick pavements; specifications for cement-concrete pavements; specifications for stone block pavements; specifications for wood block pavements; specifications for sidewallks and curbs; specifications for sewers; specifications for subgrades and foundations; specifications for street railway pavements and track construction. A paper entitled "The Engineer's Responsibility in Fostering Malaria Pestilence" will be presented by L. M. Fisher, and one on "Mosquitoes" by H. A. Varny. During this meeting the election of officers will take place and the selection of place of meeting for 1924.

On Thursday evening reports will be presented by the committee on sewerage, sanitation and garbage disposal, and by the sub-committee on sewage disposal investigations under way in Milwaukee, Chicago and elsewhere. "The Maclachean Process of Sewage Disposal at Houston, Texas," will be described by J. C. McVea; "Recent Observations on Sewage Disposal Works in Europe" will be presented by George W. Fuller; following which brief statements of recent experiences with garbage disposal in several cities will be contributed by Harrison P. Eddy, C. Arthur Poole, J. C. McVea, Glenn D. Holmes and Samuel A. Greeley.

On Friday morning reports will be presented by committees on city planning and the committee on legislation and municipal finance. "Valuation of Property for Taxation Purposes" will be discussed by Walter W. Pollock. Milton J. Ruark and C. E. Keefer will present a paper entitled "The Disposal of Night Soil in Baltimore"; and A. Clinton Decker one on "The Disposal of Night Soil in Mining Camps." Following this, reports will be presented by representatives of this society in other organizations, including committees D4 and C4 of the American Society for Testing Materials; division of engineering of the National Research Council; National Safety Council; committees on standard tests for penetration for bituminous materials, on trolley construction, on rails and track work, and on wood poles and tubular poles of the American Engineering Standards Committee; International Congress at Rio de Janeiro; the paving brick committee and the standards for drinking water committee of the U. S. Department of Commerce; and the American Construction Council.

The entertainment features include an informal reception at the Ansley Hotel on the evening of November 11th; golf on Monday and Wednesday; a reception, concert and dance at the Atlanta Women's Club on Tuesday evening; on Wednesday afternoon a ride to Stone Mountain for some and a golf tournament for others. Additional entertainments for the ladies are provided, including matinees and a tea at the Women's Club.

PENNSYLVANIA WATERWORKS ASSOCIATION

At the annual meeting in October of this association the following officials were elected:

President, W. C. Hawley; first vice-president, W. H. Miller, Jr.; second vice-president, Samuel W. Smith; third vice-president, Edgar Munson; secretary-treasurer, F. S. Purviance; executive committee, S. H. Hicks, of Wilkes-Barre, C. LaRue Munson of Williamsport, Montgomery Evans of Norristown, A. W. Lee of Clearfield and J. T. Taylor of Beaver.

PERSONALS

Houk, Ivan E., until recently city engineer of Dayton, Ohio, has accepted an appointment as engineer of the U. S. Reclamation Service. His address is Wilda Building, Denver, Colorado.

Kirkpatrick, Walter G., of Atlanta, Ga., has succeeded Prof. D. E. McLeod as Professor of Municipal Engineering at the University of Mississippi.

Luce, Arthur T., formerly superintendent of water works at Des Moines, Iowa, has accepted a similar position at Marshalltown, Iowa.

Youmans, D. L., has been appointed city manager of Muskogee, Okla.

Morrison, Ira R., has been appointed city manager of Chico, Cal.

Lawrence, F. E., has been appointed city manager of Sapulpa, Okla.

Thompson, V. Avery, has been appointed city manager of Phoenix, Ariz.

Cole, Ray, C., has been appointed town manager of Randolph, Vt.

Davis, A. P., until recently director of the U. S. Reclamation Service, has been appointed chief engineer of the East Bay Municipal Utility District, an organization of municipalities across the Bay from San Francisco one of the purposes of which is to acquire and extend the water supply services of the district.

Siems, V. Bernard, until recently assistant water engineer of the city of Baltimore, Md., has been made water engineer of that city.

Fuertes, James H., has been employed as consulting engineer by the Water Commission of Denver, Colo., on plans and specifications for $6,500,000 of water improvements.

Huggins, C. L., has resigned as city engineer of Berkeley, Cal.

Bayles, H. G., has been appointed city manager of Morgantown, W. Va.

Andrews, L. E., formerly survey engineer in the Southern Division of the New Jersey State Highways, has been appointed division construction engineer in charge of the Northern Division, with headquarters in Newark.

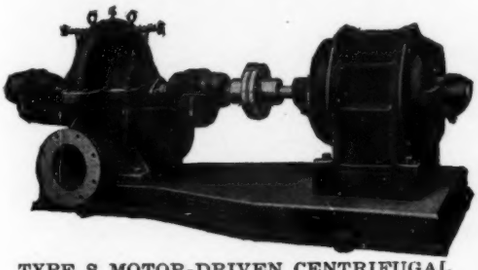
Sharples, Phillip P., formerly manager of the General Tarvia Department of the Barrett Company, has resigned and entered private practice as a consulting highway engineer.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

CENTRIFUGAL PUMPS

The Erie Pump & Engine Works of Medina, New York, advertises a split-shell, double-suction centrifugal pump, the shells being split horizontally. This pump is recommended for pumping clear or slighting muddy liquids against pressures up to 100 pounds. It is made in capacities from 50 to 15,000 gallons per minute. It can be operated continuously and safely at any speed up to 3600 r. p. m. The horizontal split allows inspection of working parts without disturbing pipe connections. It is recommended as specially suited for public water supply systems, irrigation, and drainage, and is arranged for belt, gasoline or electric drive.

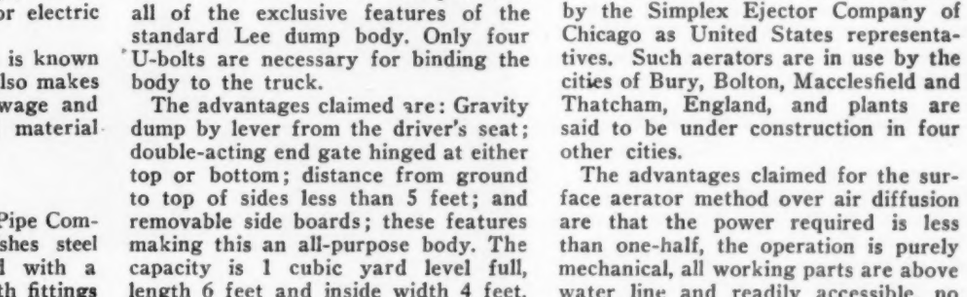


TYPE S MOTOR-DRIVEN CENTRIFUGAL PUMP.

The above described pump is known as "Type S." The company also makes other types for pumping sewage and other liquids carrying solid material and without the split shells.

LIPCO PIPE

The Lap-Joint Impervious Pipe Company, of Lynn, Mass., furnishes steel or wrought iron pipe lined with a compound of cement and with fittings and brass goods that are lined with a heavy layer of lead so shaped as to lap over the cement lining is a compound, is made up, thus covering completely and tightly the end of the pipe and any part of the metal that may have been uncovered when the pipe was cut. In connecting up the pipe, with a lead fitting, the soft metal lip is forced against the end of the hard cement lining, making a tight lap joint. This makes it impossible for the liquid in the pipe to come into contact with iron or steel at any point. The cement lining is a compound, plastic enough to be worked, but, after setting a very short time, so hard and tough that the pipe can be handled without danger of injuring the lining. The lining is claimed to be smooth, evenly dense, free from irregularities and concentric with the pipe.

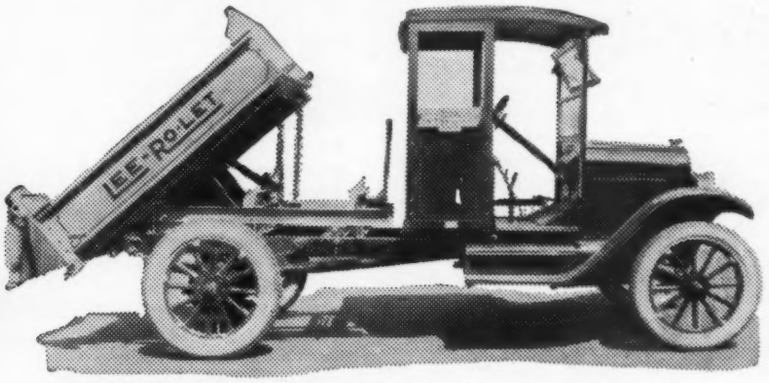


CONNECTION OF "LIPCO" PIPE WITH BRASS STOP COCK.

LEE-ROLET DUMP BODY

A special Lee automatic dump body for the Chevrolet utility truck is advertised by the Lee Trailer and Body Company of Chicago. It is intended for use with a 1-ton chassis and possesses all of the exclusive features of the standard Lee dump body. Only four U-bolts are necessary for binding the body to the truck.

The advantages claimed are: Gravity dump by lever from the driver's seat; double-acting end gate hinged at either top or bottom; distance from ground to top of sides less than 5 feet; and removable side boards; these features making this an all-purpose body. The capacity is 1 cubic yard level full, length 6 feet and inside width 4 feet, and height from ground to floor of body 3 feet 8 inches. A Lee Rolet refuse dump body is made 5 feet wide with a capacity of 1⅞ cubic yards, or 3 cubic yards with extra side boards; also a watertight garbage dump body with a 1⅞ cubic yard water level capacity.



LEE AUTOMATIC DUMP BODY ON CHEVROLET TRUCK.

AERATOR FOR ACTIVATED SLUDGE

A surface aerator for activated sludge known as the "Simplex" has been developed by experiments and tests in England and is being offered to American sewage treatment plants by the Simplex Ejector Company of Chicago as United States representatives. Such aerators are in use by the cities of Bury, Bolton, Macclesfield and Thatcham, England, and plants are said to be under construction in four other cities.

The advantages claimed for the surface aerator method over air diffusion are that the power required is less than one-half, the operation is purely mechanical, all working parts are above water line and readily accessible, no technical supervision is necessary, no

closing down of plant to renew or clean filtros plates, no air blowers or compressors or other expensive power plant; any aerator may be removed without disturbing the operation of any other part of the plant, each aerator being self-contained and all interchangeable. The plant may be driven by electric motor or steam or oil engine.

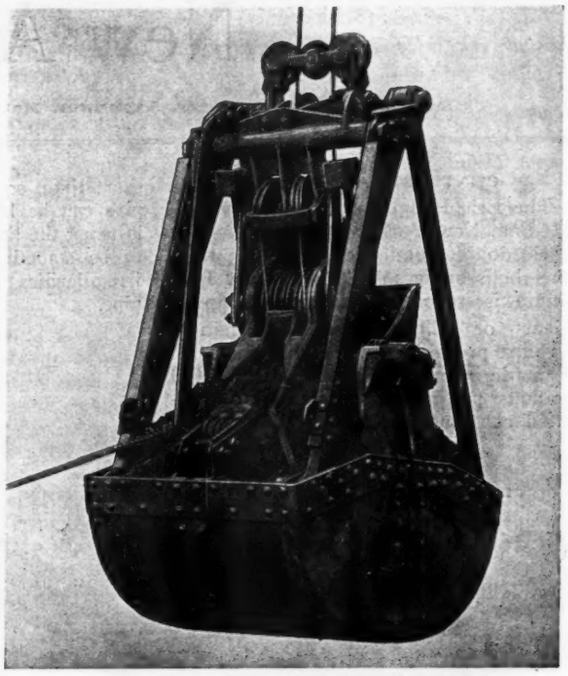
RUBBER TIRED FORDSONS

Rubber tires for Fordson trucks are manufactured by the Whitehead & Kales Company of Detroit, both solid rubber and penumatic tires being provided. W. & K. rubber tread wheels are of hollow cast disc construction. The rear wheels are equipped with 40-inch by 5-inch standard solid rubber tires and the front with 24-inch by 3½-inch tires. If unusually heavy hauling is contemplated, it is suggested that the hollow rear wheels be filled with sand, cement or steel punchings, thus increasing the weight and consequent traction. The W. & K. pneumatic tired wheels are recommended for use where particularly rough going is encountered, as they increase the riding comfort of the operator and prolong the life of the tractor. Demountable rims and standard S. A. E. tires are used, the rear tires being 40-inch by 8-inch or 42-inch by 9-inch cord tires and the front tires being 30-inch by 3½-inch standard clincher.

Where soft going is encountered, extension rims with extension cleats are provided, all rubber-tread wheels being machined, drilled and tapped ready for the application of such rims.

CLARE ROAD LEVELLER

The Clare road leveller was designed by an experienced road contractor after twenty-five years experience and is made by the Clare Road Machinery Co., of Clare, Mich. It has six blades, three on each side, set at an angle of 45 degrees and staggered in their position so that the dirt or gravel cut from the high spots is rolled from blade to blade to fill the low places and any surplus works to the center of the road. The blades and their supports are heavy enough in themselves to do the work and are swung from the frame by chains, and therefore do not raise the cart and driver when passing over rocks, etc. A shoe attached to each side beam can be adjusted to regulate depth of cut and to prevent the blades from gouging the road.

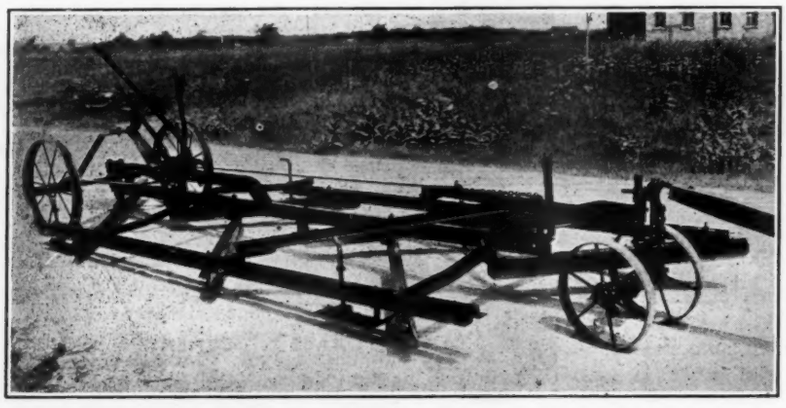


SINGLE-LINE BUCKET, BLAW-KNOX CO.

SINGLE LINE BUCKETS

The Blaw-Knox Company, of Pittsburgh, manufactures single line buckets of the clamshell or grab bucket type: a single line bucket being one in which the same line is used both for closing the bucket and for supporting it during opening. These buckets operate securely with no locks, catches or other sliding parts, but the lower block is secured by folding arms. When closed with a load it is hoisted and transported with the load securely held and cannot be dumped until the elbow joint is thrown back by the operator. These buckets are made in two general types known as "hook-on" and "direct-reeved," and with rated sizes from ⅜ cubic yard to 3 cubic yards.

W. K. THREE-TON TRAILER AND TRACTOR WITH RUBBER TIRES IN USE BY GARBAGE DEPARTMENT OF GRAND RAPIDS, MICH.



CLARE ROAD LEVELLER.

EVINRUDE HIGH PRESSURE PUMP

A high pressure pump manufactured by the Evinrude Motor Company of Milwaukee consists of a 2-cylinder, 2-cycle, 4-5-horsepower gasoline engine with the Evinrude built-in-the-wheel magneto, gravity feed carburetor and easy starting device. The engine is direct-connected to a Viking 1½-inch special type high-pressure pump, both mounted on a strong aluminum base. The complete outfit weighs only 102 pounds and is designed especially for fighting forest fires and general fire service in industrial plants and small towns. In tests it has pumped against an average pressure of 150 pounds, at times reaching 185 pounds per square inch.

ONE-WAY TRAFFIC LAMP

A lamp for regulating one-way traffic has been manufactured by the McNab & Harlin Manufacturing Company of New York City to take the place of the arrows used to designate one-way streets in that city and in others. The general appearance of the lamp is shown by the illustration. It is illuminated by six electric bulbs, one of which is in the upper compartment, one in the lower compartment and four in the lens compartment. These permit not only the light from the lenses to be seen at night, but also the instructions above and below the lenses. Thus, both by day and by night, the police regulations are prominently displayed. It is possible with this lamp also to indicate the hours during which it is used as a one-way street and those during which the traffic in both directions is permitted—information which is not given by the arrow which is the standard one-way sign in New York.

ONE-WAY TRAFFIC LAMP.

The traffic lamp shown in the illustration has been for some time in operation at the corner of 44th Street and Fifth Avenue, where the city permitted the company to install it as a demonstration.

SULLIVAN ROTATORS

The Sullivan Machinery Company of Chicago has produced a new Sullivan rotator which contains important changes in design affecting the drilling speed, repair, economy and ease in handling of rotator hammer drills. These improvements are used on all types of rotators, the light weight and auger patterns as well as the standard drills and with air and water attachments. By replacement of a few interchangeable parts, old drills may be rebuilt into the new models at small expense, thus avoiding the necessity of buying complete new drills.

Rotators are one-man hammer drills weighing from 29 to 40 pounds which will drill holes from 8 to 12 feet deep for 1½ inch powder.

INDUSTRIAL NOTES

WOOD HYDRAULIC HOIST & BODY CO.

Frank H. Dewey, for two years sales engineer of the Wood Hydraulic Hoist & Body Company, has been made assistant general manager of that company and will devote his time especially to the direction of sales promotion, advertising and co-operation with manufacturers and dealers.

BLAW-KNOX BUFFALO OFFICE

The Blaw-Knox Company of Pittsburgh announces the opening of an office at Buffalo, New York, 622 Genesee Building. J. C. McQuide has been transferred from the Pittsburgh organization as manager of the Buffalo office. This office will serve northern and western New York and the adjacent territory.

NEWS OF THE SOCIETIES

CALENDAR

Jan. 9-11—ILLINOIS SOCIETY OF ENGINEERS. Annual meeting, University of Illinois, Urbana-Champaign. Secretary, E. E. R. Tratman, Wheaton, Ill.

Jan. 12-19—**AMERICAN ROAD-BUILDERS' ASSOCIATION. The annual convention and National Good Roads Show, Chicago, Ill.**

Jan. 16-18—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting at New York City.

Jan. 17—**ASSOCIATED GENERAL CONTRACTORS AND AMERICAN ROAD BUILDERS' ASSOCIATION. Joint meeting in Chicago.**

Jan. 21-24—ASSOCIATED GENERAL CONTRACTORS OF AMERICA. Annual meeting, Chicago, Ill.

Jan. 22-23—NATIONAL PAVING BRICK MANUFACTURERS' ASSOCIATION. Annual meeting, Cincinnati, O. Secretary, Edward E. Duff, Jr., Cleveland, O.

Feb. 25-28—**AMERICAN CONCRETE INSTITUTE. Annual convention, Chicago. Secretary, Harvey Whipple, 1807 East Grand Boulevard, Detroit.**

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS

The annual convention of this society was held in Atlanta on November 12 to 16. A description of it will be found in this issue on pages 381 to 383.

AMERICAN ROAD BUILDERS' ASSOCIATION

The annual convention of this association and the National Good Roads Show will be held in Chicago on January 14 to 18. The program and other details will be found on pages 384 to 386.

OHIO FILTER OPERATORS

The Third Annual Conference of Filter Operators of Ohio was held Nov. 21st to 24th at Columbus. Sixty-three of the 65 purification plants in the state were represented. The officers elected for the coming year were: Chairman, Clarence Bahlman; vice-chairman, W. I. VanArnum; secretary, E. E. Smith.

Interesting facts and valuable information were brought out by the papers and discussions. H. T. Campion, superintendent of the Defiance plant, stated that in that plant filtros plates for applying CO_2 had been replaced by perforated pipes and that sand growth had been prevented by introducing one to ten parts per million of CO_2 in the effluent. C. P. Hoover of Columbus described a carbonator recommended for Newark and Columbus; flue gas being scrubbed to remove CO_2 from it and blown through porous concrete blocks. Almost any steam producing plant at the pumping station or vicinity would furnish twice as much CO_2 as necessary.

F. E. Sheehan, superintendent at Portsmouth, told how he reduced the amount of alum coagulant without reducing efficiency. H. W. Streetor described the progress made by the U. S. Public Health Service in studying the efficiency of water purification processes by means of an experimental filter installed at Cincinnati and a survey of sixteen plants. D. H. Rupp stated that in the East Liverpool filter electrolytic action was found taking place between brass strainers of different composition. Strainers also were found plugged with concrete and oakum. A control valve which failed to operate was found to have been installed backward; all of which necessitated a considerable amount of reconstruction.

A joint session was held with the County District Commissioners of Ohio to discuss the use of iodine for eliminating goitre, and it seemed to be the unanimous opinion that application of iodine to water supplies was much more expensive than individual treatment.

PORTLAND CEMENT ASSOCIATION

The 21st Anual Meeting of the Portland Cement Association was held in New York Nov. 19th to 21st. The first day was devoted to meetings of standing committees on Accident Prevention and Insurance, Advertising and Publicity, Conservation, Technical Problems, and others. The second day was devoted to discussion of problems concerning mill practice, papers being presented by Paul C. VanZandt, chief engineer of the Asano Portland Cement Company, on "The Manufacture of Portland Cement in Japan," and by T. H. Cosford, assistant to general manager of the Marquette Cement Manufacturing Company, on "Modern Cement Storages and Improvements in Methods of Loading and Packing and Bag Handling." On Wednesday there were reports of the several committees and the election of officers. F. W. Kelley of Albany, New York, was elected president, Blaine S. Smith of Chicago first vice-president, L. R. Burch of New York second vice-president, and John W. Boardman of Detroit treasurer.

NATIONAL PAVING BRICK MANUFACTURERS' ASSOCIATION

The Annual Meeting of this association will be held January 22 and 23 at Cincinnati and preliminary plans have already been made by the secretary. To provide time in a two-day session to thoroughly discuss the problems that are met by the salesmen and field promotion men, superintendents and operating managers, and owners and executive officers, it is planned to have group or sectional meetings during the afternoon of the first day, at which these different groups will meet in sections to discuss their respective problems; each section being presided over by a chairman.

The programs for the other sessions have not yet been completed. However, it is proposed that the morning of the first day be devoted to two or three talks by prominent speakers, with ample time for discussion. The entire convention will then lunch together and the sectional meetings will follow. The annual banquet will be held at 6:30 P. M., which will be, as usual, the feature of the meeting. The business session Wednesday morning, where the activities of the past year will be briefly reviewed and the operating policy and budget for the ensuing year will be considered, will bring the meeting to a close about noon.

ADVISORY BOARD ON HIGHWAY RESEARCH

The Advisory Board on Highway Research of the National Research Council met in Washington, D. C., November 8 and 9, with A. N. Johnson, chairman of the Executive Committee, presiding. Thomas H. MacDonald, chief of the U. S. Bureau of Public Roads, in an address entitled, "Objectives of Highway Research," emphasized the thought that the highway engineer, besides faithfully performing his day-by-day tasks, must also engage in research work if he would advance his profession and himself.

Charles M. Upham, state highway engineer of North Carolina, in a paper entitled, "Research Program of North Carolina Highway Commission," laid emphasis on the need of practical highway research and its translation into road service for the highway user.

The chairman of the Committee on Structural Design of Highways, A. T. Goldbeck, presented his report, a digest of which we will give next month. The Committee on Character and Use of Road Materials, H. S. Mattimore of the Pennsylvania Highway Commission, chairman, reported, as the result of this committee's research, that the strength of Portland cement concrete varies with the amount of actual solid material present in a given volume and with the relative parts of this volume that are cement and aggregate. Also, other conditions being the same, the strength varies with the amount of mixing water, but grading of aggregate has a decided effect upon the amount of water that may be used to yield a workable mixture. There is need for research to develop methods for making more uniform concrete upon a large scale in practice in order to apply the information already available in the design of concrete mixtures.

The Committee on Highway Finance, J. G. McKay of the U. S. Bureau of Public Roads, chairman, considered a

budget system an essential part of a highway program. He discussed the use of credit for raising revenue and stated that real property taxation for highway purposes bears too large a portion of the burden of highway expenditures, a survey of four Wisconsin counties showing it to be from 55% to 70% of the total highway revenue; local units producing 47.5%, county units 41.8% and the state 10.7% of the real property revenue. The highway user is largely responsible for highway improvement and should pay a larger part of the cost in the form of motor vehicle and gasoline taxes.

The Committee on Economic Theory of Highway Improvement, T. R. Agg of Iowa State College, chairman, reported that results of investigations published or in process of publication by that committee included "Truck Performance on Grades," "Rolling Resistance and Related Characteristics of Roadway Surfaces," "Economics of Highway Grades," and "Quartermaster Tractive Resistance of Roads Research."

The Committee on Highway Traffic Analysis, G. E. Hamlin of the Connecticut Highway Commission, chairman, called attention to the fact that a traffic census gives information concerning the traffic at that particular time only and it is necessary to endeavor to predict the probable amount and character of future traffic during the life of the several component parts of the highway. It is, therefore, recommended that traffic census counts be taken at critical periods of the year in several successive years and these data be used for plotting curves for predicting future traffic. An outline was given of traffic survey methods and costs in the State of Connecticut. It was reported that a self-recording traffic counting and weighing device, to be operated at minimum cost, is being developed.

The Committee on Maintenance of Roads, W. H. Root of the Iowa Highway Commission, chairman, reported that corrugations form in all gravel roads when the traffic exceeds 500 or 600 vehicles a day and that their formation is in no way dependent upon the construction or maintenance methods but is caused by the displacement of material due to the thrust of the drive wheels and by the impact of both front and rear wheels after a bounce. Dragging with heavy equipment after a rain is a temporary corrective. The report outlined the use of calcium chloride and refined tar on gravel roads and the maintenance of such roads with a mulch treatment of gravel, which consists of frequent light applications of loose, clean gravel up to ¾-inch size.

The Committee believed that expenditures by state maintenance organizations should be divided into: (1) maintenance of ministration; (2) maintenance proper; (3) additions and betterments, and, (4) parks, camping grounds and roadside beautification. The second item would include expenditures for the increased permanent value of the road to accommodate traffic, such as increasing width, new guardrails, drainage structures, etc., and improving grades, alignment and vision. Maintenance costs should be reduced to a ton-mile unit for comparison between states and between types of road surfaces.

The U. S. Bureau of Standards gave progress reports on "Research on Tires" and "Tests of Braking and Stopping Conditions of Motor Vehicles." Dr. H. M. Westergaard, of the University of Illinois, discussed "Mechanics of Stiff Road Slabs."

W. K. Hatt, director of the Board, reported that highway research has made such progress that at present a well-trained and experienced highway engineer can select a type of highway suitable to the conditions of climate and traffic of a given situation, can specify the materials and design the section with a reasonable certainty that it will withstand the specified conditions of service. Much remains to be done, however, in unlocking the stored-up data in the files of state highway commissions, which are now such active agencies in highway research.

The Executive Committee selected for the ensuing year is: A. N. Johnson, chairman; A. F. Flinn, vice-chairman; W. K. Hatt, director; H. C. Dickinson, T. R. Agg, T. H MacDonald, C. M. Upham and A. J. Brosseau.

PERSONALS

Smith, Arthur L., has been appointed Division Engineer in the Alabama State Highway Department with office at Selma.

Howland, Charles A., formerly with the U. S. Department of Health, has been appointed Staff Engineer of the Bureau of Municipal Research, Washington.

Andrews, Harry S., formerly bridge designer for the Long Island Railroad, has been appointed Commissioner of Public Works of Fulton, New York.

Brown, N. Adelbert, formerly engineer of sewage and garbage disposal plants at Rochester, N. Y., is now with the C. O. Bartlett-Snow Company in charge of garbage and rubbish disposal plants. He is now constructing a plant for the company in Philadelphia.

Hopkins, William R., attorney and engineer, was selected on December 6 as the first city manager of Cleveland, Ohio.

Wasser, Thomas J., was elected president for the coming year of the Highway Association of New Jersey.

Albers, John, has been appointed city manager of Beverly Hills, California.

Ramsay, Malcolm, has been appointed city engineer of Temple, Texas.

Whitman, Ezra B., member of the Public Service Commission of Maryland, will become chairman of the Commission on January 1st, next.

Gray, William J., formerly civil engineer in the U. S. Engineer's Office at Wilmington, Delaware, is now superintendent of waterworks at Springfield, Missouri.

Webb, T. H., recently assistant state highway engineer for Texas, has been appointed county engineer of Callahan County of that state.

INDUSTRIAL NOTES

A JAPANESE ELECTRIC MANUFACTURING COMPANY

Westinghouse and Japanese electrical interests are reported to have formed a Japanese electric manufacturing company to be known as the "Mitsubishi Electric Manufacturing Company" with a capitalization of $7,500,000. This company will manufacture Westinghouse products in Japan. A part of the stock is held by the Westinghouse Company, which will profit by a continuous revenue for service and royalties in lieu of profit on exports, while the Japanese will profit by employment given to native workmen.

ORTON AND STEINBRENNER COMPANY

The Orton and Steinbrenner Company of Chicago has just completed a large addition to its plant at Huntington, Indiana, which will approximately double the company's output of locomotive cranes, buckets and other appliances.

UNITED STATES CAST IRON PIPE AND FOUNDRY COMPANY

This company announces the appointment of Thomas P. Anthony as chief engineer with his office at Burlington, New Jersey. Also that P. T. Laws has been appointed southern district manager of the company with his office at the American Trust & Savings Bank Bldg., Birmingham, Alabama.

SCHUBERT-CHRISTY CONSTRUCTION AND MACHINERY COMPANY

Frank H. Schubert and William G. Christy announce the organization of the above-named company with offices in St. Louis, Missouri, where it will represent leading manufacturers of power plant equipment and render general construction engineering services, specializing in the design and construction of water-cooling equipment for refrigerating and power plants, the designing of special machinery, process development and difficult construction work.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

"DRIFT BREAKER" SNOW PLOW

An all-steel V-type plow manufactured by the La Plant-Choate Manufacturing Company of Cedar Rapids, Ia. Points emphasized are strength, mould board shape, ease of operation, and adaptability to conditions. The mould board rolls the snow up and over to the side wings, which are hinged to the main frame and can be extended at any angle to a maximum spread of 28 feet. The wings can be adjusted vertically as well as horizontally, so as to shave off the top of the bank to prevent drifting, if desired.

By means of a hydraulic lift the plow proper can be elevated in seven seconds to give a clearance of at least two feet when traveling over uneven ground, railroad tracks, etc., and when turning around. The pump that operates the jack can exert a pressure of 300 pounds per square inch, controlled from the seat of the driver of the track-laying tractor, for which this plow is especially built.

The main frame is supported by four sled runners. The plow is so attached to the main frame that the two rear points of the sub-frame are higher than the line of power, causing the point of the plow to dig in, but can not go below a fixed point where it is held by oil in the hydraulic jack. It is claimed that the plow, because of the one-unit frame construction, steers much more easily than those having the side wings attached to a trailer.

The ten-ton plow has a height of nose of 54 in., height of rear of V, 65 in., width of plow 10 ft. with wings closed and 28 ft. with them open, and height of wings 36 in. The five-ton plow has dimensions about two-thirds as great.

"DRIFT BREAKER" SNOW PLOW.

BEEMAN SNOW PLOW

A small plow for clearing snow from sidewalks and park walks is produced by the Beeman Tractor Co. of Minneapolis. It is a V plow attached to a Beeman tractor, which in summer is used for operating lawn mowers and other purposes. The point of draft is from the rear of the tractor, thereby preventing the front of the plow from being pushed up. The front of the plow may be raised to clear the curb or other obstruction by pressing down on the handles.

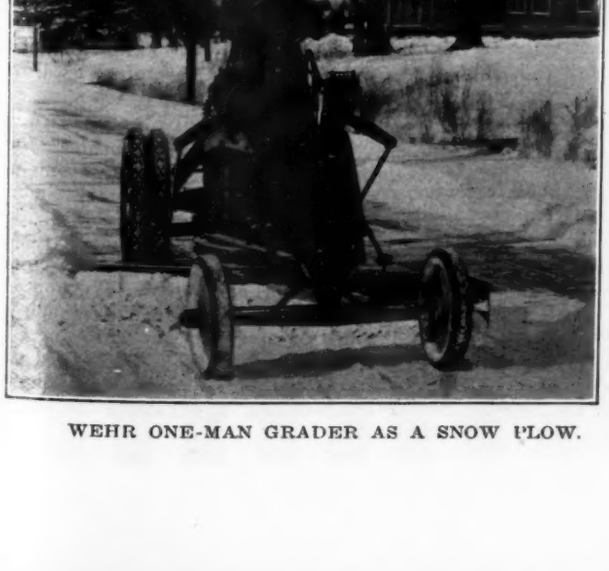
WEHR GRADER FOR SNOW WORK

The Wehr one-man power grader, made by the Wehr Company of Milwaukee, has been used very successfully for handling snow in St. Paul and other cities. Early this year, in that city, one man and a Wehr 9,400 lb. grader cleared snow from 32 miles of streets in two days. A standard Fordson tractor is the power unit, which enables the user to get quick service on any motor part anywhere in the country.

The grader is constructed with a heavy steel channel frame carrying a 6-foot blade, which can be raised or lowered or tilted at any angle desired. The power unit is behind the blade and the weight of it is utilized to hold the grader steady on the road when working. The motor is swung on a three-point suspension so that no unnecessary strains are put upon it.

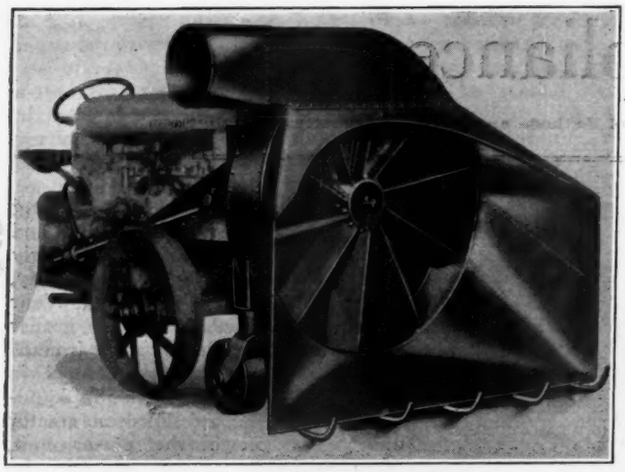
DALLMANN ROTARY SNOW PLOW

A snow plow for use with a Fordson tractor manufactured by the Dallmann Machine & Mfg. Co., of 921 Winnebago St., Milwaukee. A rotating propeller throws the snow to one side of the road. The plow can be driven in high gear through the average fall of snow, clearing a path wide enough for one-way traffic and clearing the other side of the road on the return trip.



WEHR ONE-MAN GRADER AS A SNOW PLOW.

BEEMAN SNOW PLOW.



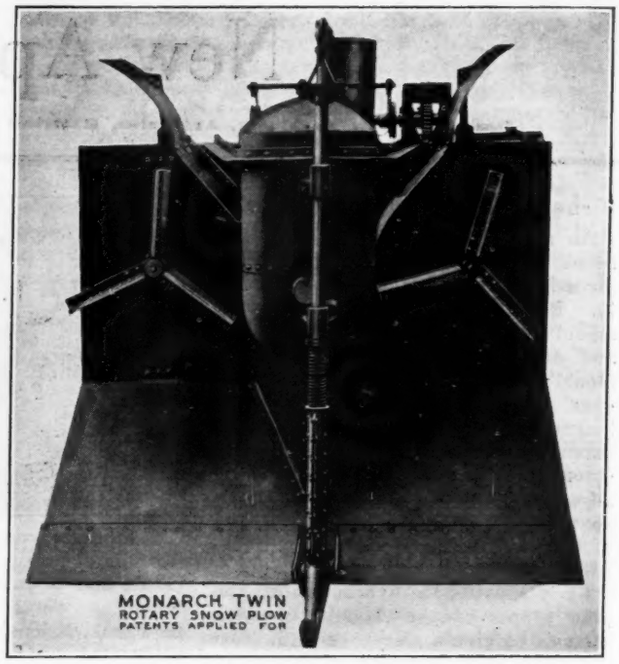
DALLMANN ROTARY SNOW PLOW.

Power is taken from the tractor through a specially designed Smith Unit, which transmits power through a pair of spiral bevel gears, enclosed in a grease-tight housing, through a heavy propeller shaft, a heavy-duty universal joint and forward drive gears. The plow, with its apron and snow propeller, rides on its own wheels, and the entire mechanism is free to rise and fall with the irregularities of the road.

When bucking heavy drifts the driver can shift to low gear. A special starting device, which enables the operator to spin the motor, assures an easy and quick start.

No drilling or tapping is required in attaching the snow plow to the Fordsome. A pivoted anchorage is provided by brackets bolted on either side of the crank case by means of the studs that already connect the two sections of this.

In operation, the tractor pushes the apron into the snow, which is thus guided into the propeller which, rotating at high speed, throws it through the discharge opening to the side of the road. Any tendency to stall in a heavy drift can be prevented by slowing the forward motion or backing up, allowing the propeller to clear itself.



MONARCH TWIN ROTARY SNOW PLOW.

BAKER SNOW PLOW

A plow to be attached to an auto truck, made by the Baker Manufacturing Co. of Springfield, Ill. The outstanding feature is a set of safety tripping blades. This was described in this department of the issue for October, 1923.

W. & K. SNOW AND STREET BRUSH

Arranged to be attached to a Fordson tractor, made by the Whitehead & Kales Co. of Detroit. A rotary brush is driven direct from the tractor motor. This was described in this department of the issue for October, 1923.

MARTIN SNOW REMOVER

An all-steel, reversible, adjustable snow blade made by the Owensboro Ditcher & Grader Co., of Owensboro, Ky. Drawn by two horses, a single blade will clear a sidewalk or gutter. With Model 20 twin blades, each 5 feet long and 17½ inches wide at the cutting end, hauled by a tractor or several teams, heavy snows can be handled, street car tracks kept free of snow, etc.

When not in use as a snow remover, the snow blades can be removed and each used separately for street grading. The Martin has no cogs, levers or wheels—nothing to break or get out of order.

TWIN MARTIN SNOW REMOVER.

MONARCH TWIN ROTARY SNOW PLOW

A rotary plow which throws the snow to either or both sides of the road, manufactured by Monarch Tractors, Inc., of Watertown, Wis. It is a self-contained unit, powered by a Beaver heavy-duty industrial motor. Two heavy steel fans are chain-driven at a speed of about 350 r. p. m. Each fan can be disconnected independently by means of a twin disc clutch. The fans run on heavy Timken bearings and the whole construction is strong and simple. The front shoe and rudder are designed to assist in steering, but the plow can be controlled easily by the tractor through heavy, oscillating push bars attached to the crawlers. Movable vanes around the fan control the height and distance to which snow may be thrown.

The plow is 8 feet wide and weighs about 4,500 pounds. It is intended to take care of snow conditions that can not be handled by the easier methods of straight plowing heretofore used.

FOX ROTARY SNOW SWEEPER

A rotary broom and "turbine" for throwing snow from the roadway, manufactured by the Fox Rotary Snow Broom Company of Newark, N. J. It can be mounted on any standard truck of from 3 to 5 tons capacity. It consists of a broom 34 ins. in diameter with bristles of ¼ in. rattan sweeping a width of nine feet and revolving at 400 r. p. m. (This can be changed to 125 r. p. m. for sweeping street dirt.) When working on highways the snow

FOX ROTARY SNOW BROOM MOUNTED ON PIERCE-ARROW CHASSIS.

is thrown clear of the road, but in city streets an apron or shield of steel plates with heavy side curtains is lowered in front of the broom to prevent the snow being thrown onto the sidewalk. For heavy snow or ice, steel turbine blades or soft steel ice saws may be substituted for the broom on the same shaft.

The broom is mounted on the forward end of a frame that is supported on the truck, a counterweight serving to maintain a constant pressure of the broom on the road and permitting it to rise if it strikes an obstruction, and to follow all irregularities of the surface. The operator can regulate the pressure or raise the broom at will.

The main frame is attached to the truck chassis by U bolts, as in mounting truck bodies, and the broom shaft is carried on three members pivotally mounted on the front of the main frame. This shaft carries four broom seats to which four broom halves are clamped. The broom is rotated by a standard gasoline motor entirely independent of the truck, from which the power is transmitted by Morse silent chain drive and bevel gears, all enclosed in cast steel housings and run in a bath of oil.

The "turbine" has a series of blades mounted around its periphery, with edges parallel to the axis of the shaft. With this turbine the sweeper has cut through drifts seven feet high. For ordinary snow storms the broom is adequate.

CHAMPION SNOW PLOW

A blade plow sold by the Good Roads Machinery Co. of Kennett Square, Pa., which can be attached in a very short time to any truck or tractor, special study of the hand wheel shaft and brackets, the lifting device, and the axle clamps having made this possible. The steel blade is 10 ft. long and 20 in. wide, hung to a semi-circular steel frame making it possible to set it at any angle.

Special points are: Automatic blade release, permitting blade to pass over obstacles; universal axle clamp, fitting any truck on the market; lifting device and hand wheel shaft adjustable for any truck; tilting device; and mold board with renewable edge 6 in. wide and ¼ in. thick. New York City has over a thousand of these plows and Boston has just purchased fifty.

THE CATERPILLAR FOR SNOW REMOVAL

Under this title the Holt Manufacturing Co. of Peoria, Ill., have issued a 16-page catalogue describing work done by the "Caterpillar" in pushing snow plows through city streets and country roads for several years past. New York City used 50 in 1920-'21. The 10-ton is used for heavy work in city and country, such as bucking drifts; the 5-ton for general city work, parkways, etc.; and the 2-ton for sidewalks, industrial yards, and streets where the snowfall is not excessive.

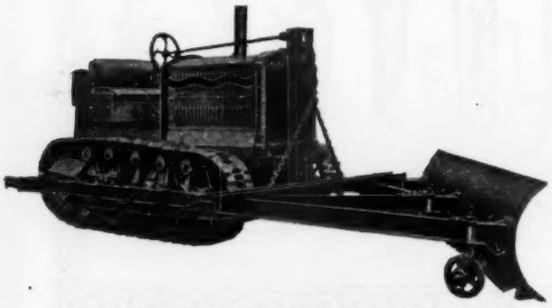
Holt engineers have developed special types of plows for attachment to Caterpillars—a blade type for moderate snow falls and quickly opening up streets and roads, and a wing type for breaking out roads where the fall is heavy and bucking deep drifts. The blade is made with a curve to enable the snow to roll up and flow off at the side and prevent the accumulation of a big head of snow. The frame is built of heavy steel I beams trussed with gusset plates, and the blade is pivoted to it and adjustable at different angles, being held rigidly at any angle by I beams and clamps. Two relief or spring trip blades are hinged to the lower edge of the mold board and held in position by helical springs, which allow the blades to hinge back if they strike a manhole or other obstruction.

FOX "TURBINE," WHICH CAN BE SUBSTITUTED FOR BROOM.

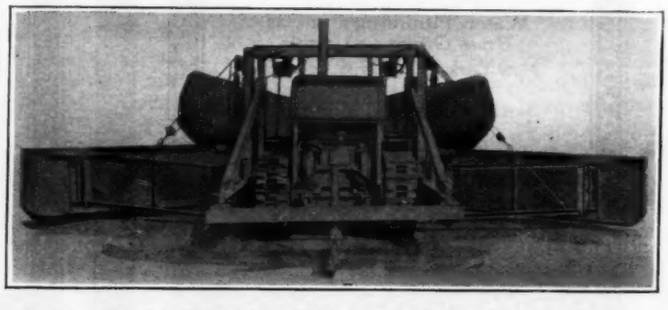
The wing type is all steel, combining cutting edge, mold boards and wings, and is strong enough to withstand the power of two 10-ton tractors pushing it. It is an independent unit pushed by means of a push frame which goes around the sides of the tractor and is connected to the tractor draw bar at the rear. It rides on sled runners and so can follow any unevenness of the road surface. The mold boards are so designed that the snow is delivered at their outside top ends. Wings can be added for wide cuts up to 30 feet. The wings can be lifted to any height up to 3 feet above the cutting edge.

AUTOMATIC SKIP GUARD

The "Rex" automatic skip guard is manufactured by the Chain Belt Company of Milwaukee, manufacturers of the "Rex" pavers. Its purpose is to prevent accidents due to the dropping

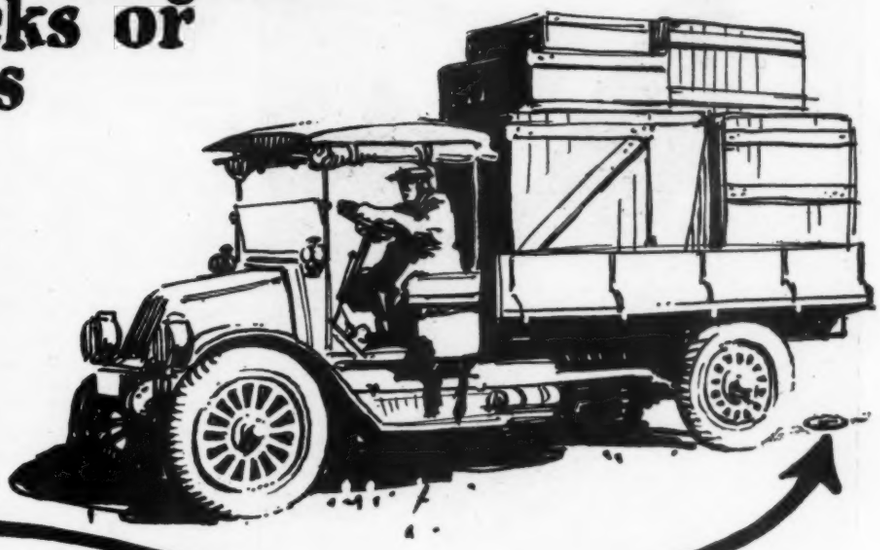


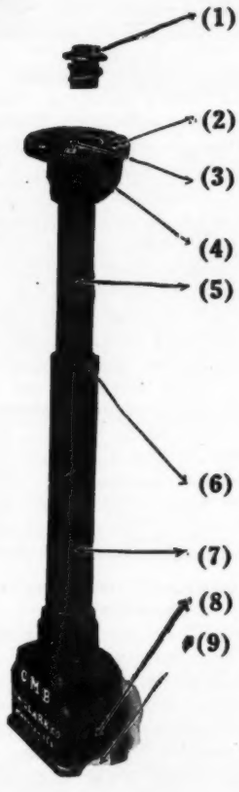
"CATERPILLAR" BLADE SNOW PLOW.



WING PLOW WITH TEN-TON CATERPILLAR TRACTOR.

No more damaged service cocks or leaky pipes caused by Heavily Loaded Trucks





1—Long screw cap—one turn and it is off.

2—Flanged top gives good support at surface of ground.

3—Brass bushing prevents corrosion.

4—Fin prevents box from turning.

5—Sliding extension feature allows for frost action. Surface loads not communicated to cock or pipe.

6—Bead prevents sections from separating.

7—Heavy cast iron base.

8—¾" pipe notch.

9—1" pipe notch.

C.M.B SERVICE BOX

eliminates all trouble

Think what it means to have no more trash filled boxes—no more broken or lost tops and bolts—no more inoperative cocks because of failure to engage key. All of those and many other troubles are done away with. No digging up necessary to adjust to grade. Box cannot shift. Service cock is always in center.

They come in a large variety of sizes to meet every possible condition; to fit Minneapolis cock; also for lead pipe. Equipped with extension rods when desired.

Send at once for full particulars.

Ask Us About the Clark Valve Boxes and Valve Housings

Write for Bulletins

Clark Meter Boxes—Southern (A)
Clark Meter Boxes—Northern (AA)

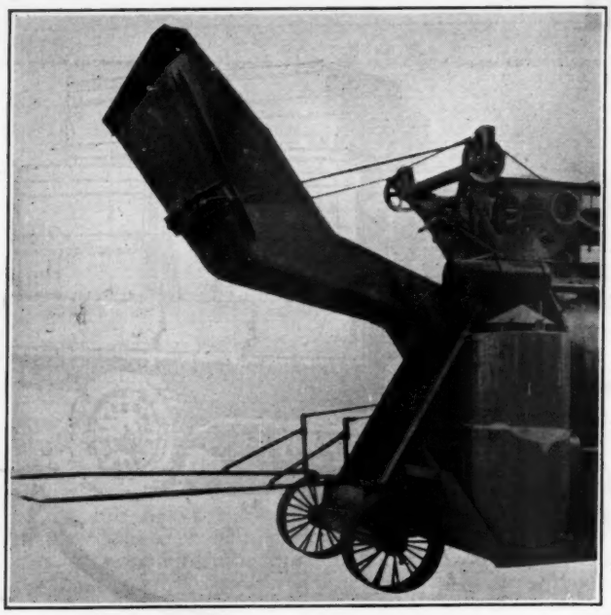
Clark Meter Testing Machines—Six Models—Bulletin B.
Clark Testing Instruments Increase Earnings—Bulletin C.
The New C. M. B. Service Box Corrects All Service Box Faults; Valve Boxes, Valve Housings, etc.—Bulletin D.
Water Works Pumps of All Kinds—Bulletin E.
Municipal and Miscellaneous Castings—Bulletin F.
Venturi Meters—Check Your Pumpage and Waste—Bulletin G.
CAST IRON PIPE, FIRE HYDRANTS and VALVES, AIR VALVES, BRASS GOODS, etc.—Bulletin H.

H. W. CLARK COMPANY
1308 BROADWAY
MATTOON, ILLINOIS, U. S. A.

THE CLARK METER BOX — TRADE MARK — PROTECTION

Everything for the water works and municipality

NEW YORK SALT LAKE CITY CHICAGO
MEMPHIS SAN FRANCISCO BUFFALO



REX AUTOMATIC SKIP GUARD.

or falling of a skip onto one of the workmen, which is said to constitute 90 per cent. of the accidents to the crew around a paving mixer. The standard skip of a 21-E paving mixer when loaded weighs about 2½ tons.

This guard consists of a strong pipe framework securely fastened to the lower main frame of the paver and completely encircling the skip. When the skip is down this guard rests on the ground and does not interfere with the loading of the skip. As the skip is raised the guard rises also until it is 3½ ft. from the ground, where it remains until the skip is lowered again.

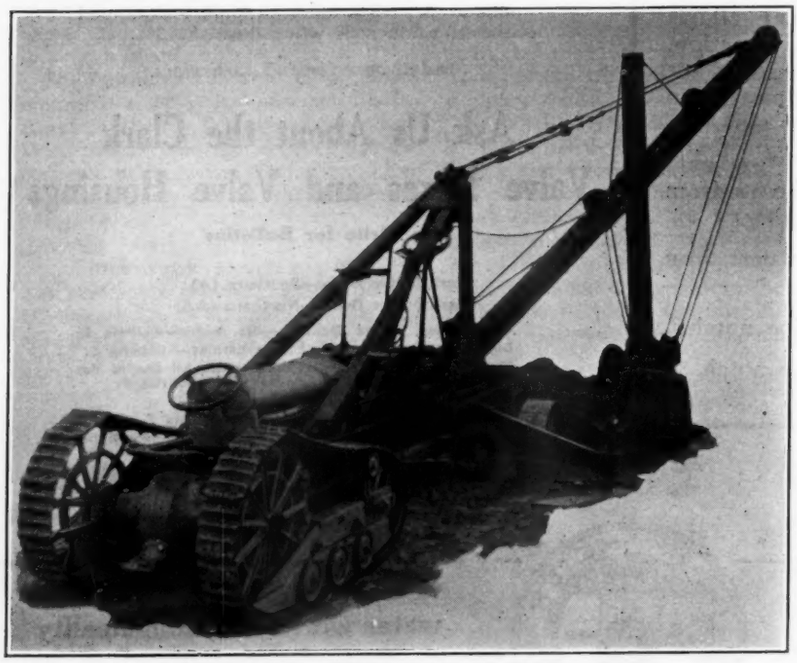
BRITERLITE UNBREAKABLE LAMP

What is claimed to be an almost unbreakable incandescent lamp is being marketed by the Greater Service Electric Company of Newark, N. J. The lamp is an improved Mill type, the stem supporting the coiled filament being much stronger than in other lamps. The bulb, it is said, will withstand excessive vibration, and to break the filament one must break the glass. The lamp is especially adapted for machine shops, garages, locations near railroads, etc. It is made in 25 and 50-watt sizes.

INSLEY GASOLINE SHOVEL

The Insley Manufacturing Company of Indianapolis has just placed on the market a 1/3-yard gasoline shovel with a view to furnishing a shovel and crane that will stand up under severe service and still be obtainable at a considerably lower cost than any now on the market; believing that there are many classes of work where the yardage to be handled does not warrant investment in ¾-yard shovels and larger.

This Insley shovel is ruggedly constructed to stand up under severe operating conditions. The power is furnished by a Fordson unit, the connection with it being such that shovel and Fordson can be disconnected in a short time. It can be operated by one man. While designed primarily for a 1/3-yard dipper, it can be used for ditching or clamshell work, a ½-yard ditcher scoop and crane attachment being available. This machine will make its first appearance at the Good Roads Show in Chicago next month.



INSLEY ONE-THIRD YARD GASOLINE SHOVEL.

INDUSTRIAL NOTES

TIFFIN WAGON COMPANY

The president of the Tiffin Wagon Company, George Dudley Loomis, died on November 1st at the age of 76. Mr. Loomis was also president of the Loomis Machine Company and of the Tiffin National Bank.

PAWLING AND HARNISCHFEGER COMPANY

This company has recently appointed R. P. McCormick as its eastern sales manager with headquarters at 50 Church Street, New York City, and 605 Stephen-Girard Building, Philadelphia. It has also appointed Norman P. Farrar as district manager with headquarters at these same offices.

STROUD AND COMPANY BUSINESS PURCHASED

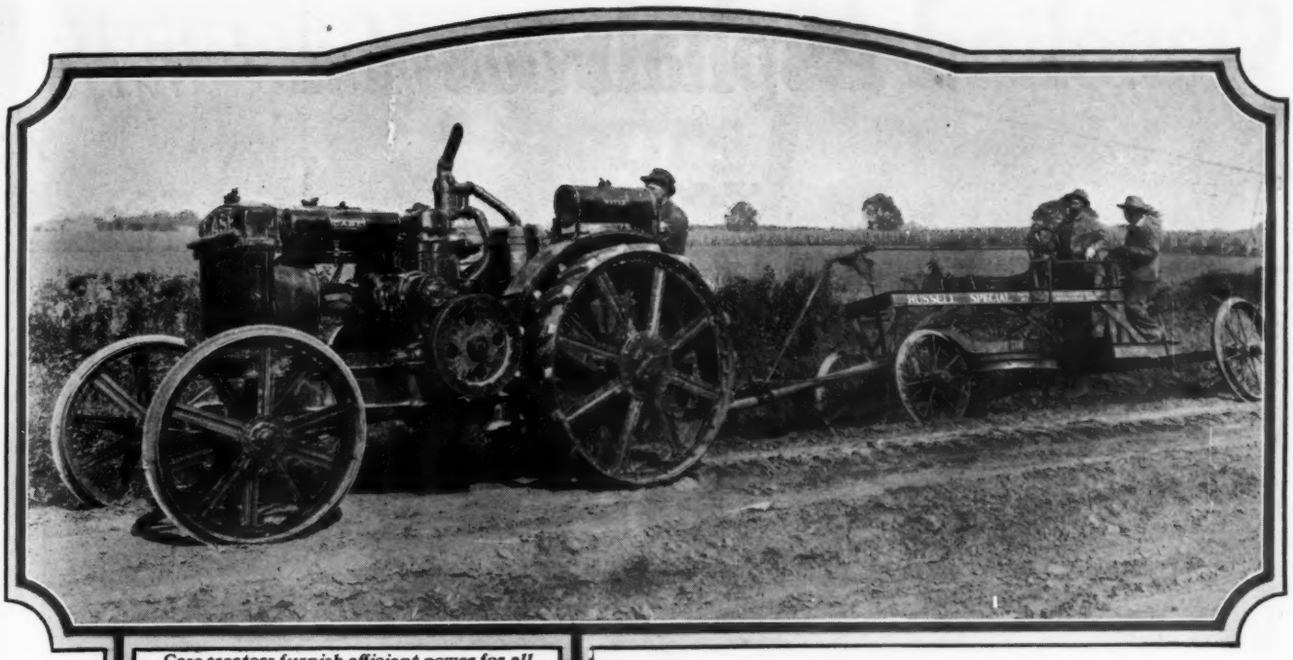
The Little Red Wagon Manufacturing Company of Omaha has purchased the business of Stroud & Company of that city and will continue the manufacture of Stroud elevating graders, Little Red dump wagons, road maintainers, scrapers, drags, plows and other road-making machinery. It will continue the Stroud Parts Service for the benefit of contractors, some of whom have been using Stroud graders and dump wagons for over 25 years.

HEIL COMPANY DISTRIBUTING STATIONS

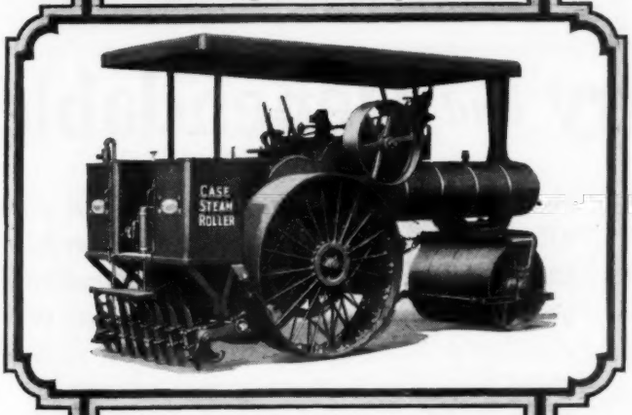
The Heil Company has announced two new distributors, one the Kranz Automotive Body Company at St. Louis, and the Shop of Siebert at Toledo, Ohio. These firms will carry a complete stock of Heil bodies, hoists and tanks. These make a total of 20 distributors for the Heil Company in the United States.

LINK BELT COMPANY

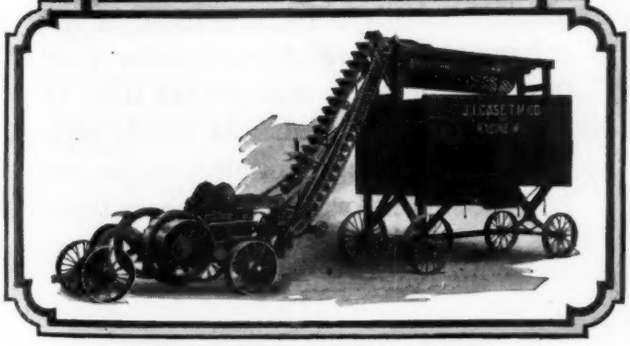
Richard W. Yerkes, formerly general manager of the Link Belt Company's Philadelphia plant, has been appointed treasurer of the Link Belt Company succeeding B. A. Gayman, who will head the newly acquired Meese & Gottfried Company of San Francisco.



Case tractors furnish efficient power for all road building machines and operations.



Case steam roller—10 and 12 ton sizes. Develops over 40 H.P. on the brake. Normal traction speed 2¼ M.P.H. Large capacity fuel bunkers and water tank. Economical, dependable, durable.



This compact, portable crushing plant has large volume for the power required, great strength, and durability. Breaks stone into uniform size, fine or coarse as desired

Three Exceptional Road Building Machines

The Case Tractor

Case tractors are designed specially to meet the need of road builders for dependable, economical power. They are compact, easy to handle at traction and belt work, and exceedingly durable.

Generous reserve power, proper weight distribution and effective traction speeds insure good, fast work under all conditions.

There are four sizes: 12-20, 15-27, 22-40, 40-72, an efficient size for every operation.

The Case Steam Roller and Scarifier

For many years the Case Steam road roller has been a recognized leader in its field. The addition of a practical, steam operated scarifier of unusual strength and efficiency makes this a highly efficient machine for modern road construction. It is equally satisfactory for belt work and can be used as a hauling engine.

The Case Rock Crusher, Screen and Bin

This handy, portable outfit comes in two sizes, with capacities of 10 to 25 tons per hour. Crushers are of the jaw type. Screens separate stone into four sizes, each falling into its own compartment in the bin, from which it is loaded into wagons by pulling down a spout on either side.

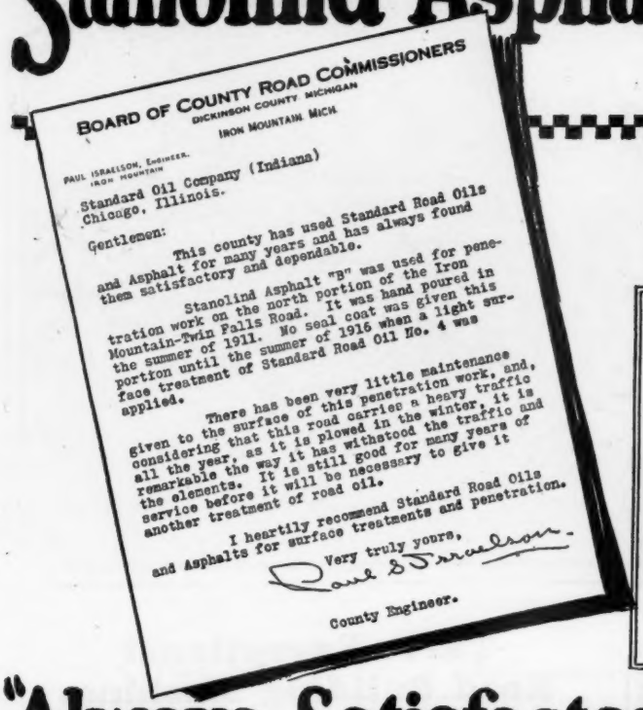
These three machines, necessary in all extensive road work, are our contribution to better and more profitable road building. Make your files complete by writing for full information.

J. I. CASE THRESHING MACHINE COMPANY

[ESTABLISHED 1842]

Dept. M90 **Racine • Wisconsin • U • S • A**

Stanolind Asphalt-*Iron Mountain, Mich.*



BOARD OF COUNTY ROAD COMMISSIONERS
DICKINSON COUNTY MICHIGAN
IRON MOUNTAIN, MICH.

PAUL ISRAELSON, Engineer.
IRON MOUNTAIN

Standard Oil Company (Indiana)
Chicago, Illinois.

Gentlemen:

This county has used Standard Road Oils and Asphalt for many years and has always found them satisfactory and dependable.

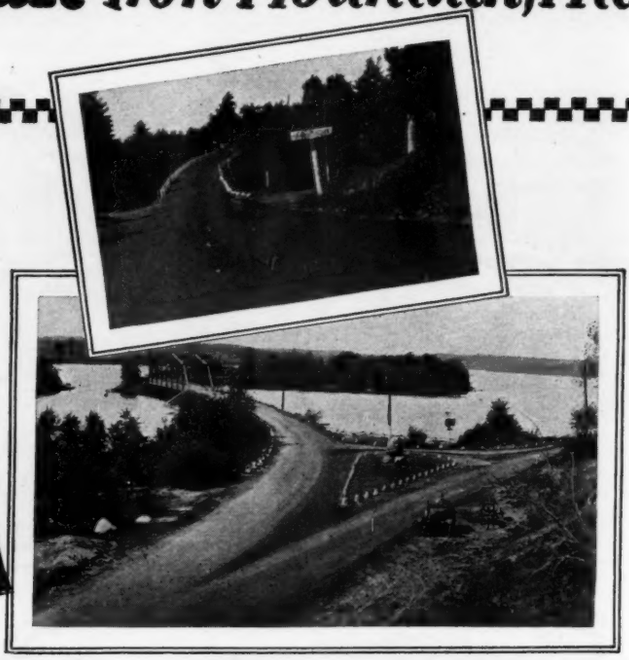
Stanolind Asphalt "B" was used for penetration work on the north portion of the Iron Mountain-Twin Falls Road. It was hand poured in the summer of 1911. No seal coat was given this portion until the summer of 1916 when a light surface treatment of Standard Road Oil No. 4 was applied.

There has been very little maintenance given to the surface of this penetration work, and, considering that this road carries a heavy traffic all the year, as it is plowed in the winter, it is remarkable the way it has withstood the traffic and the elements. It is still good for many years of service before it will be necessary to give it another treatment of road oil.

I heartily recommend Standard Road Oils and Asphalts for surface treatments and penetration.

Very truly yours,
Paul S Israelson

County Engineer.



"Always Satisfactory *and* Dependable."

YOU can give the taxpayers of your community good, permanent roads at a low cost of construction and maintenance if they are built by the penetration method, using Stanolind Paving Asphalt.

Economy of construction is characteristic of this type of pavement. Expensive machinery and labor are not necessary to lay it properly. Old road beds can usually be left in place if subgrade and base are in good condition. Local rock or stone can often be used and transportation charges saved.

Long life and low maintenance cost are also inherent and important features of Stanolind Asphalt roads. The hard pounding of heavy, speeding traffic is absorbed by the resilient water-proof surfaces. Neither the heat of summer nor the cold of winter affect them detrimentally. The Iron Mountain-Twin Falls Road has withstood twelve years of continuous, heavy traffic and twelve northern Michigan winters, and it is still good for many more years of service, although Mr. Israelson's letter states that very little maintenance work has been done.

Stanolind Asphalt roads are an asset to any community. They are the arteries of transportation which, year after year, support its business and social life. If your community will build its roads now with Stanolind Paving Asphalt, you, too, will say, ten, fifteen or perhaps fifty years from now: "It is remarkable the way *they* have withstood the traffic and the elements."

If you have not received your copy of our booklet telling the latest methods of constructing and maintaining asphalt pavements, we suggest that you write us at once. It will be a valuable addition to your business library. Use your official stationery, please.

STANDARD OIL COMPANY
(INDIANA)
910 S. Michigan Avenue **CHICAGO, ILLINOIS**

Rebuilt, from the bottom—**up!** That's the Gray Giant system of street and road maintenance.

Take any unpaved street or road, no matter how neglected, rutted, or hard-packed into bumps and pot-holes; the Gray Giant Combination Tractor - Scarifier - Grader-Roller will completely **rebuild** it, from bottom to top, at a speed of 1 to 1½ miles of rebuilt highway per day.

This 16,000 pound machine reduces operating costs up to **$55 a day.**

Gray Giants are enthusiastically used in the four corners of the country.

Send for descriptive folder "C D."

"Built on the Gray Standard of Excellence—Sold on Its Performance"

Gray Giant

Combination Road-Street Rebuilder and Maintainer

1. *Scarifies*
2. *Crushes*
3. *Grades*
4. *Rolls*

Available for road construction work—hauling up to 10-foot grader.

Also belt work.

Powered with 50 H. P. Waukesha motor.

Weight, 16,000 pounds.

THE GRAY TRACTOR COMPANY, Inc.

MINNEAPOLIS, MINN.

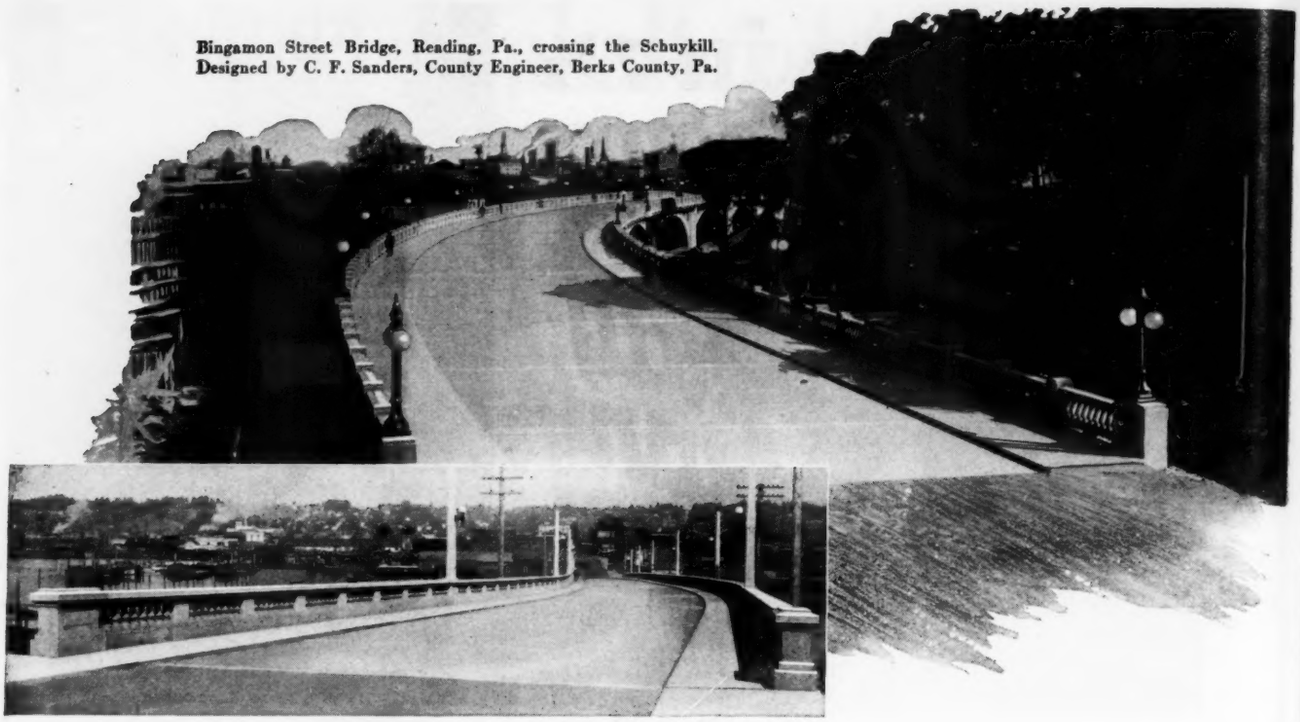
5 Nassau Street
New York City

WICHITA, KANSAS

Third and Hamilton Streets
San Pedro, Calif.

168 No. Michigan Avenue
Chicago, Ill.

WINNIPEG, MANITOBA



Bingamon Street Bridge, Reading, Pa., crossing the Schuykill.
Designed by C. F. Sanders, County Engineer, Berks County, Pa.

Bridge at Olympia, Wash. Elastite Expansion Joint used.

Protecting great bridges against temperature

TEMPERATURE fluctuation, and the consequent expanding and contracting of these great concrete masses, are rendered harmless to the durability of big bridges and viaducts by the installation of Elastite Expansion Joint at regular intervals.

The fact that Elastite Expansion Joint, "the sandwich joint," is handled as a slab, in any dimension and thickness, makes installation comparatively simple and easy. It is the practical joint used exclusively by practical engineers and contractors. It is easily cut to shape with an old saw, or can be supplied cut to exact fit to meet your requirements.

When you need "joint," remember that there are big stocks of Elastite Expansion Joint in seventeen cities. Your order will be immediately shipped to your job from the nearest point. Send for sample and all the facts.

THE PHILIP CAREY COMPANY
10 Wayne Ave., Lockland, Cincinnati, Ohio

Carey Elastite Expansion Joint is used in these bridges and viaducts

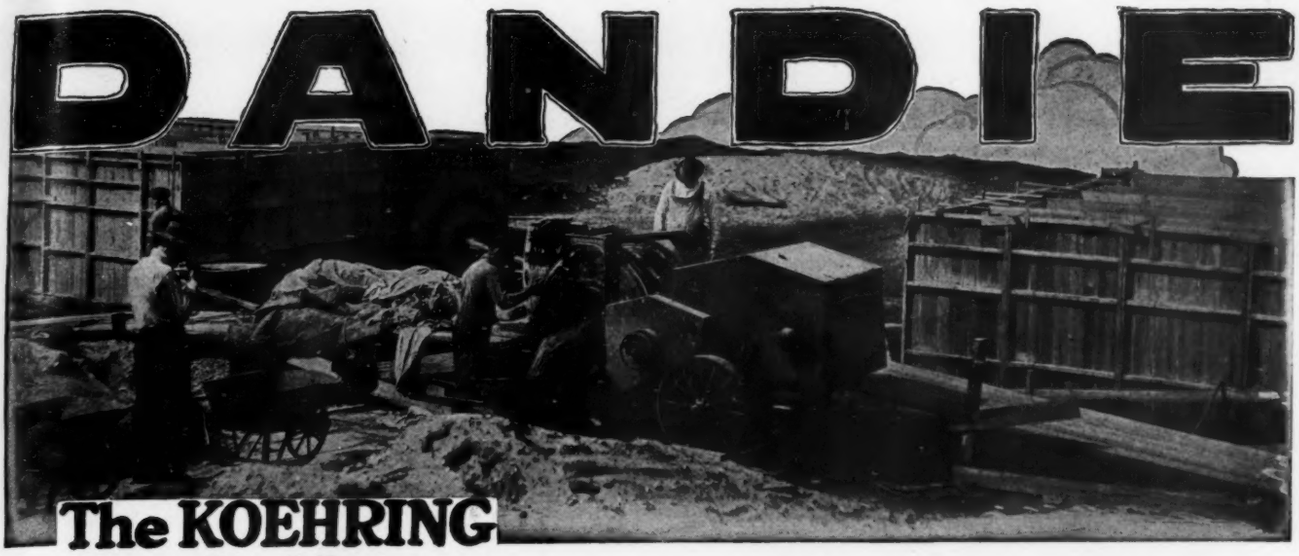
Akron Ohio — North Hill Viaduct
Augusta, Ga. — Archibald W. Butts Memorial Bridge
Bethlehem, Pa. — Hill-to-Hill Bridge
Cincinnati, Ohio — Park Avenue Bridge
Fort Wayne, Ind. — Harrison Street Bridge
Galveston, Texas — Galveston Causeway
Hawkinsville, Ga. — Ocmulgee River Bridge
Kansas City, Mo. — Benton Boulevard Viaduct
Little Rock, Ark. — Broadway Bridge
Oahu, Hawaii — Heeia Viaduct
Pulaski, New York — Salmon River Bridge
Reading, Pa. — Bingamon Street Bridge
St. Louis, Mo. — Chauteau Avenue Viaduct
St. Louis, Mo. — Jefferson Avenue Bridge
Laredo, Texas — Laredo International Bridge
Washington, D. C. — Key Bridge
Watertown, New York — Grove Street Bridge

Carey Elastite
Reg. U.S. Pat. Office
EXPANSION JOINT
PROVED AND ACCEPTED

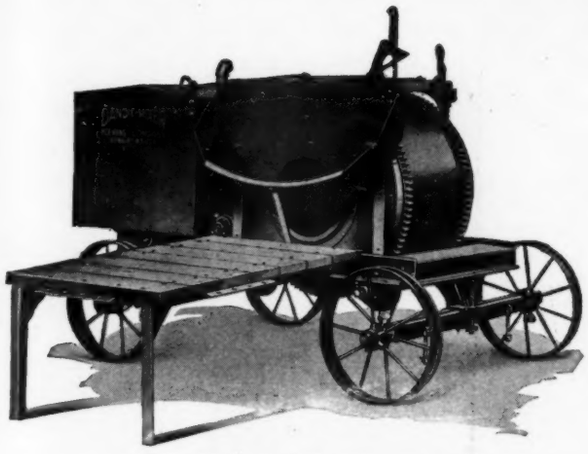
Carey Elastite Expansion Joint is an asphaltic body, formed of a high-grade asphaltic compound carefully refined and tempered, sandwiched between two walls of asphalt-saturated felt forming an elastic, compressible joint. It is made in lengths, widths and thicknesses as required, can be cut to crown or to any special shape and comes to the job ready to use.

12-23

DANDIE



The KOEHRING Light Mixer



104 S—4 Cubic Feet Mixed Concrete

107 S—7 Cubic Feet Mixed Concrete

Get the Price — Get the Specifications

NO, it's not the cheapest mixer in price—but it is the greatest *value* in the light mixer class and it is within the light mixer price range. It will outwork, outwear and outlast ordinary light mixer construction. It will still have a long profitable future ahead of it, when the ordinary light mixer is costing you big money to keep it out of the junk pile!

Send back the coupon. Get the Dandie catalog that informs you how to judge mixer values. You'll find it a practical, helpful, money-saving booklet.

Dandie Capacities

4 and 7 cu. ft. mixed concrete, steam and gasoline. May be equipped with power charging skip, low charging platform, light duty hoist, automatic water measuring tank. Mixes mortar as well as concrete. Send back the coupon today.

KOEHRING COMPANY

Manufacturers of Concrete Mixers, Cranes, Draglines, Shovels

MILWAUKEE, WISCONSIN

Sales offices and service warehouses in all principal cities.

Foreign Department, Office 1370, 50 Church St., New York City;
Canada, Koehring Company of Canada, Ltd.,
105 Front Street, East, Toronto, Ontario;
Mexico, F. S. Lapum, Cinco De Mayo 21, Mexico, D.F

KOEHRING COMPANY
MILWAUKEE, WIS.

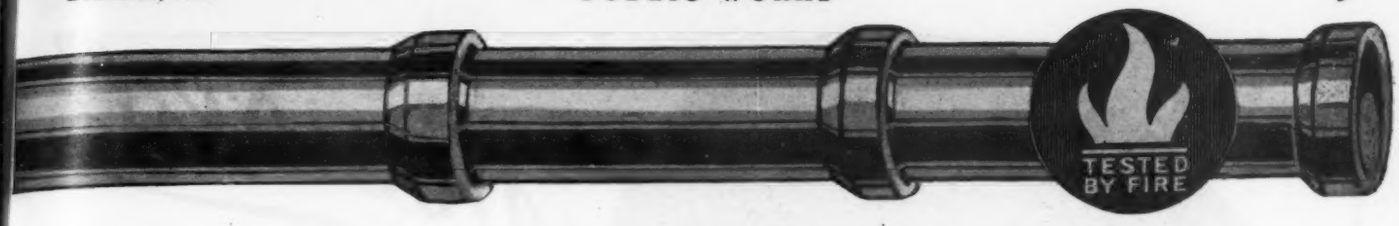
Please send me Koehring Dandie Mixer Catalog No. P. 14 and give full information on interchangeability for mixing concrete and mortar.

Name .....

Address .....

.....


TESTED
BY FIRE
TESTING
A series illustrating the present day practice and processes



VITRIFIED CLAY PIPE

From mine to finished product

A block of cones for determining various temperatures is placed where they can be readily observed through the peephole. These cones are composed of clays which have definite fusing temperatures and fuse to a shapeless mass when these temperatures are reached in the kiln.

In many plants pyrometers are used in conjunction with the cones to record the temperatures at the various stages of fusing. Test pieces are also placed in the kiln where they can be easily reached by a hook through the peephole. These test pieces are removed at intervals and show the progress of the burning and the glazing.

VITRIFIED CLAY
The Pipe Everlasting

In the average clay the first signs of fusing occur at about 1750°f. Vitrification is completed when the pipe reaches that stage of fusion beyond which the pipe would be melted down to a shapeless mass.

Great care and precaution are necessary to maintain the proper heat for the process of burning and glazing and are very important to the final strength and quality of the pipe.

Eastern Clay Products Association

Henry T. Shelley, Secy., Mgr. :-: Phone Spruce 5029

906 Colonial Trust Building, Philadelphia, Pa.

Members Eastern Clay Products Association

The Buckeye Fire Clay Co.
Uhrichsville, Ohio

Cambria Clay Products Co.
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Clearfield Sewer Pipe Co.
Clearfield, Penna.

Crouse Clay Products Co.
Akron, Ohio

The Dennison Sewer Pipe Co.
Dennison, Ohio

East Ohio Sewer Pipe Co.
Irondale, Ohio

Evans Pipe Co.
Uhrichsville, Ohio

Junction City Sewer Pipe Co.
Junction City, Ohio

Logan Clay Products Co.
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Patton Clay Mfg. Co.
Patton, Penna.

Penna. Clay Products Co.
West Winfield, Penna.

Robinson & Sons Sewer Pipe Co.
Uhrichsville, Ohio

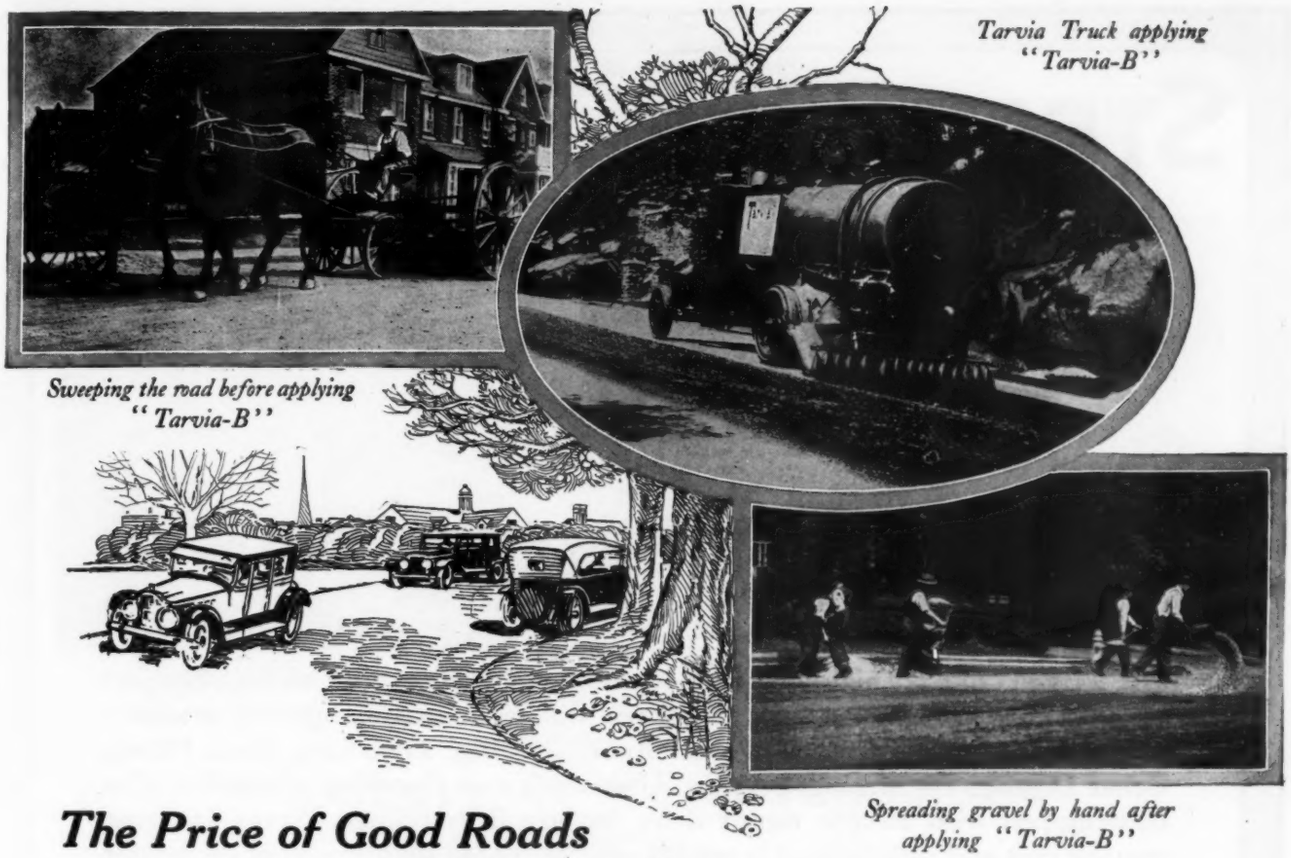
Robinson Clay Product Co.
Akron, Ohio

Romig Clay Products Co.
Uhrichsville, Ohio

Ross Clay Products Co.
Uhrichsville, Ohio

St. Mary's Sewer Pipe Co.
St. Mary's, Penna.

Wolf-Lanning Clay Co.
Dennison, Ohio



Tarvia Truck applying "Tarvia-B"

Sweeping the road before applying "Tarvia-B"

Spreading gravel by hand after applying "Tarvia-B"

The Price of Good Roads is Eternal Maintenance—

EXPERIENCE has proved that every type of modern road or highway requires regular, systematic upkeep to withstand the grinding wear of modern traffic.

And experience has also proved that every type of improved road can be satisfactorily and economically maintained with Tarvia. Hundreds of cities, towns, and rural communities throughout the United States and Canada, after experimenting with various methods and materials, today employ Tarvia maintenance on their streets and highways.

Tarvia, preeminent as a road-building material, is made in special grades that are unequalled for reconstructing, repairing and maintaining all types of improved roads — from gravel-surfaced country highways to city pavements. Tarvia keeps every type of good roads good, at minimum cost and with minimum interruption to traffic.

Send for Your Copy of "Road Maintenance With Tarvia"

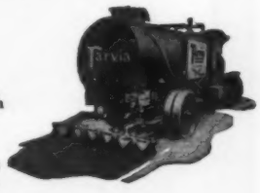
You are interested in economical maintenance for the roads of your community —you want to *keep* your roads good so that larger sums will be available for additional road construction. Then send for "Road Maintenance with Tarvia." This is an interesting 56-page booklet containing 89 illustrations showing how Tarvia maintenance is applied to various kinds of road construction. Address "Tarvia Service Department," at our nearest branch. Write today!

Tarvia
For Road Construction Repair and Maintenance

The Barrett Company

New York	Chicago	Philadelphia	Boston
St. Louis	Cleveland	Cincinnati	Pittsburgh
Detroit	Kansas City	Birmingham	Dallas
Minneapolis	Salt Lake City	Bethlehem	Lebanon
Youngstown	Milwaukee	Toledo	Columbus
Baltimore	Syracuse	New Orleans	Rochester

THE BARRETT COMPANY, Limited:
Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.



Actual photograph, Woodbury, N. Y.

Woodbury, N. Y., Is Prepared! (Is Your City, too?)

The annual snow peril already hangs over many Northern cities. In some localities, the public may be made to suffer for interrupted traffic, snowbound fire equipment, stalled ambulances, trolleys and all other traffic.

But not in Woodbury, N. Y.! Wm. McClellan, supervisor for that progressive city, tells how Woodbury has conquered the snow problem:

"Appreciating the importance of keeping our roads open during the winter months we purchased a 10-Ton "Caterpillar"* with snow-plow. Before the tractor arrived there was an accumulation of about a foot of snow from the winter storms, and the "Caterpillar" outfit cleared the roads without difficulty and kept them open throughout the winter.

"The power developed by "Caterpillars" equips them to go through practically any snow-storm and they are the only dependable method we know of for clearing snow from the highways. The "Caterpillar" travels 3 to 4 miles an hour and the outfit is operated by two men. For our purpose we estimate that it should do the work for at least ten years, and we have a feeling of satisfaction in knowing that we are able to take care of a snow-storm at present that kept us laboring for days with all the forces we could command."

There's still time to protect the safety, health, and commerce of your city, no matter what storms may come. Let us give you interesting figures on the performance of 2-Ton, 5-Ton and 10-Ton "Caterpillars"—how they can serve your community the year round as well as in winter. Write today.

**There is but one "Caterpillar"—Holt builds it*

THE HOLT MANUFACTURING COMPANY, *Inc.*

PEORIA, ILLINOIS

EASTERN DIVISION: 50 CHURCH STREET, NEW YORK

Branches and service stations all over the world

Omaha, Neb.
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CATERPILLAR
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HOLT
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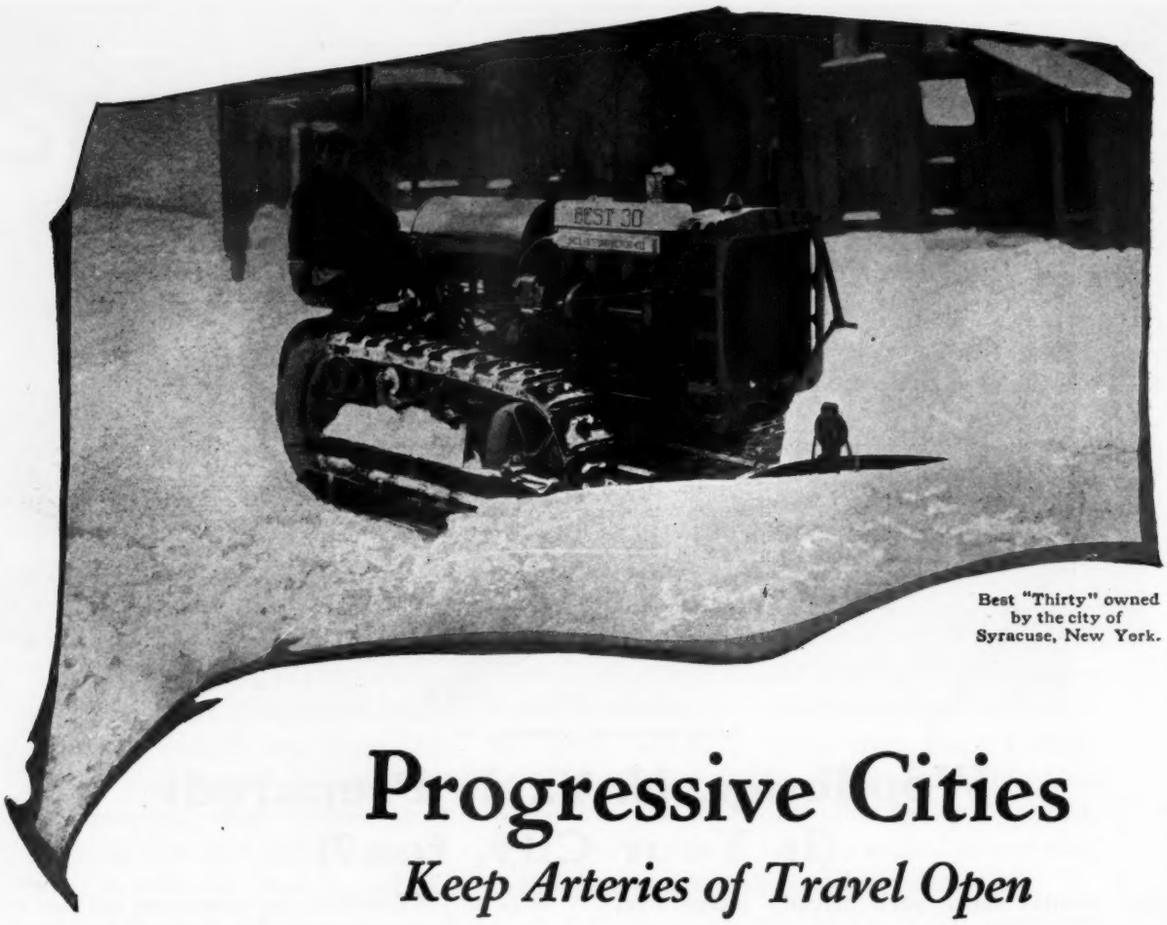


Best "Thirty" owned by the city of Syracuse, New York.

Progressive Cities

Keep Arteries of Travel Open

"After a demonstration with a C. L. Best 'Sixty' Tractor and a snow plow, we were convinced our city could not afford to be without the equipment," writes the Mayor of a Wisconsin city.

No progressive city will allow a snow fall to block its streets and stifle business activity. Tractors have made removal work too easy for that.

It will pay you to investigate the dollars and cents value of a Best "Sixty" or "Thirty" equipped to keep your streets open. *In addition, there is the year 'round usefulness of these machines to consider.*

Just off the Press!

Reasons for snow removal—evidence of the popular demand for it—and information on ways and equipment for accomplishing it are contained in our new and authoritative book, "The Open Road."

Your copy will gladly be mailed on request. *Send for it!*

C. L. BEST TRACTOR CO.

SAN LEANDRO, CALIFORNIA

Sales Branches

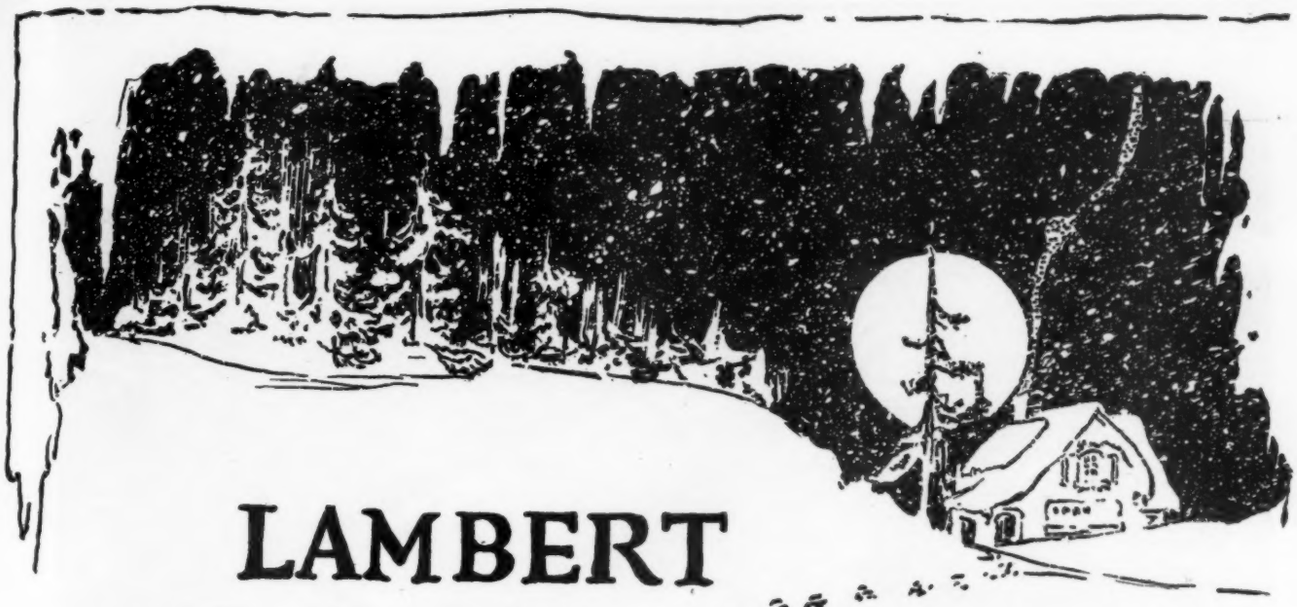
127 Montgomery St., San Francisco, Calif.

Distributing Warehouse 820 North Second St., St. Louis, Mo.

30 Church St., New York City

114-1223

BEST TRACTORS



LAMBERT FROST PROOF METERS

Can be Frozen

without damaging in the least

Note the Illustration

See how the top and bottom castings part—when under excessive pressure caused by frost. After freezing, the slitted collars can be reclosed and the meter bolted anew.

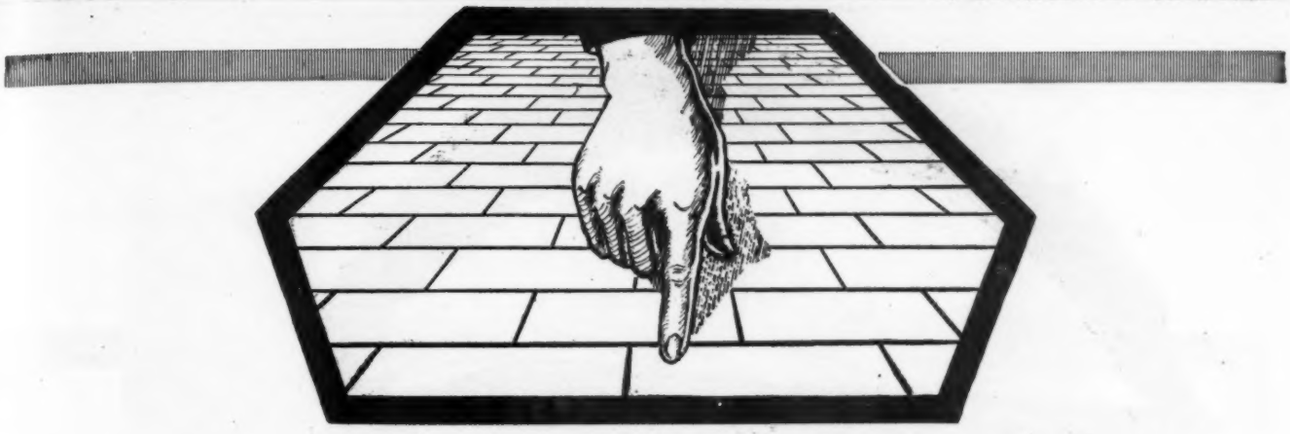
This operation can be repeated without the necessity of furnishing any new parts.

Couple of minutes labor to put it back in shape. Guaranteed for one year but will last a lifetime. Made in sizes 5/8", 3/4" and 1" ready for delivery.

Catalogue showing full line of meters for every requirement for the asking.

Thomson Meter Company

100-110 Bridge Street **Brooklyn, N. Y.**



Salvage Value—100%

Albion Shale Brick Company
Albion, Ill.
Alton Brick Company
Alton, Ill.
Barr Clay Company
Streator, Ill.
Binghamton Brick Company
Binghamton, N. Y.
Cleveland Brick & Clay Company
Cleveland, Ohio
Clydesdale Brick & Stone Co.
Pittsburgh, Pa.
Coffeyville Vitrified Brick & Tile Co.
Coffeyville, Kans.
Collinwood Shale Brick Company
Cleveland, Ohio
Corry Brick & Tile Company
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Francis Vitric Brick Company
Boynton, Okla.
Georgia Vitrified Brick & Clay Co.
Augusta, Ga.
Globe Brick Company
East Liverpool, Ohio.
Hammond Fire Brick Company
Fairmont W. Va.
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Independence Paving Brick Co.
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Wheeling, W. Va.
C. P. Mayer Brick Company
Bridgeville, Pa.
Medal Paving Brick Company
Cleveland, Ohio.
Metropolis Paving Brick Co.
Pittsburg, Kansas.
Metropolitan Paving Brick Co.
Canton, Ohio.
Mineral Wells Paving Brick Co.
Mineral Wells, Texas.
Moberly Paving Brick Company
Moberly, Mo.
Murphysboro Paving Brick Co.
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Patton Clay Mfg. Company
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Purington Paving Brick Company
Galesburg, Ill.
Southern Clay Mfg. Company
Chattanooga, Tenn.
Springfield Paving Brick Company
Springfield, Ill.
Sterling Brick Company
Olean, N. Y.
Streator Clay Mfg. Company
Streator, Ill.
Thornton Fire Brick Company
Clarksburg, W. Va.
Thurber Brick Company
Ft. Worth, Texas.
Toronto Fire Clay Company
Toronto, Ohio
Trinidad Brick & Tile Company
Trinidad, Colo.
Veedersburg Paver Company
Veedersburg, Ind.
Western Shale Products Company
Fort Scott, Kans.
Westport Paving Brick Company
Baltimore, Md.

VITRIFIED
Brick
PAVEMENTS

WHEN Duval County, Florida, thirteen years ago, paved the Pablo Beach Road with brick, the county engineers proved themselves farsighted care-takers of the public funds.

After the wear and tear of thirteen years had finally battered the surface until it was no longer perfectly smooth, the engineers of 1923 discovered an interesting truth—*that the brick bought in 1910 was worth more in 1923 than the county had originally paid for it.*

Lifting the bricks out of their places, exposing the base, they found and corrected the cause of the trouble. Regrading and in part rebuilding the base, they relaid the brick of 1910, applied the asphalt filler, and sent the bricks back to another decade or more of service.

A new roadway with virtually no cost for surfacing material—(only a few new brick were purchased).

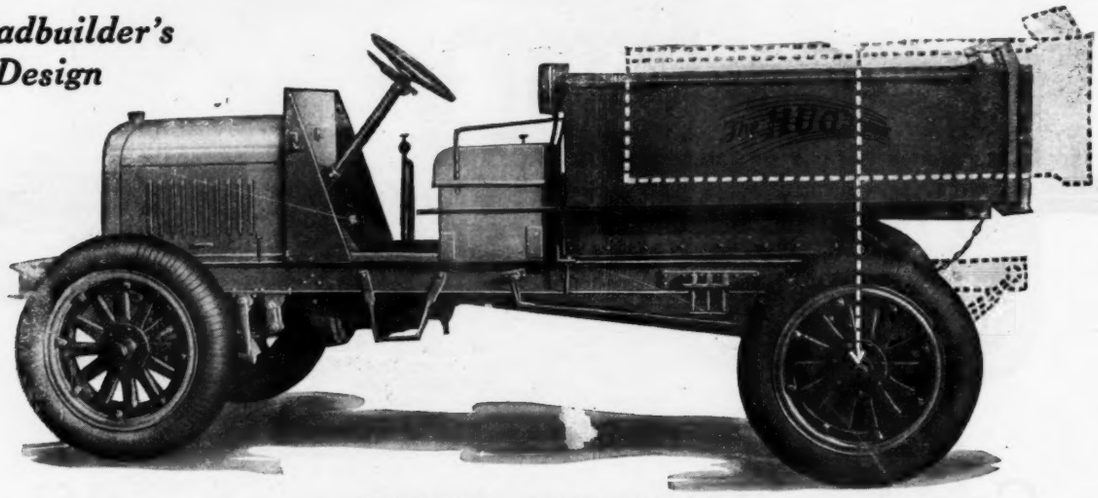
Have you ever looked at the brick in the pavements in your community from that angle?—do you realize that they have a salvage value that may today be greater than their first cost—and that the brick pavements you lay today will have a similar asset value a generation or more from now?

NATIONAL PAVING BRICK
MANUFACTURERS ASSOCIATION
ENGINEERS BLDG. CLEVELAND, OHIO

OUTLAST THE BONDS

Still More Speed on the Road Job

A Roadbuilder's Own Design



THE NEW HUG TRUCK

Dotted lines show extension of frame and awkward centre of gravity on customary altered commercial truck. Note superiority of the low-lying, forward-slung, specially designed Hug Gravity Dump Body.

The advantages of power dump bodies have at last been combined with Gravity Dump design in the special Hug Body for the New Hug Truck for 1924!

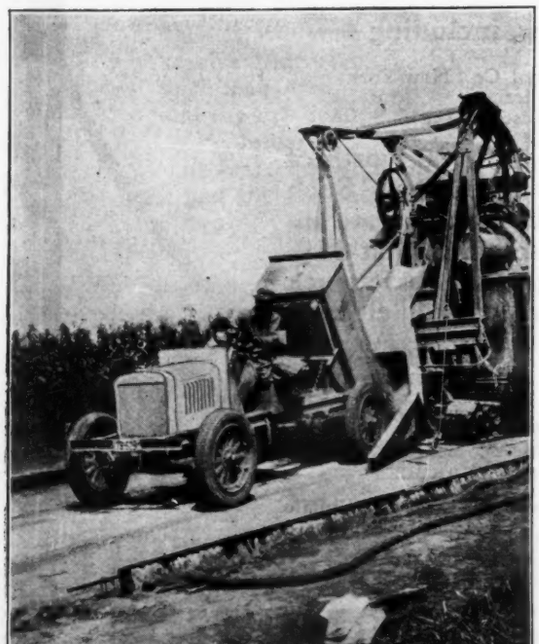
In addition to the achievement of a new low center of gravity on the New Hug Truck, the weight of the load is also thrown well forward of the rear axle. The even load distribution secured protects the subgrade, the truck, and the tires. This feature is one of the most important considerations in buying a roadbuilder's truck.

On the road the New Hug Gravity Dump Body is locked, wedge-tight, preventing rocking and racking.

Better balance and the low center of gravity permit the Hug Truck to safely put still more speed in the road job for 1924. Improved, original spring design also contributes to greater speed on rough hauls without excessive abuse to the chassis.

There are two sizes in the New Hug Truck line —one for the 4 and 5 bag Batch, and one for the 6 and 7 bag Batch.

Either one of these New Hug One Batch Mixer-skip Trucks, like the old ones, will quickly pay for itself on the job.



Hug Truck dumping dry aggregate into the mixer skip.

Keep the Mixer Going

Allowing half a minute for lost motion and inefficiency, every minute and a half a batch must be dumped in the mixer skip or an idle mixer will steal your road profits.

On a 7¼ mile concrete highway job, for one of the large companies in Illinois, twelve Hug Trucks kept the mixer always going. The average haul was 1.82 miles. The average cost per ton mile was 6½c., and repairs were too minor in nature to be included in the Operation Records! Twenty-seven other Hug Truck Fleet Owners in Illinois will be glad to tell you how the Hug Truck, with its practical roadbuilder's design, has reduced their costs and put new profit in the road job.

On Exhibition at Chicago

At the Road Show at the Coliseum in Chicago, from January 14th to 18th, in the first space to the left inside the Main Entrance, in Booths Nos. A-1, A-2, and A-3, the entire new Hug line will be displayed. You will not only find new value in the Hug Truck, but also a new Turntable, and a new Subgrade Planer.

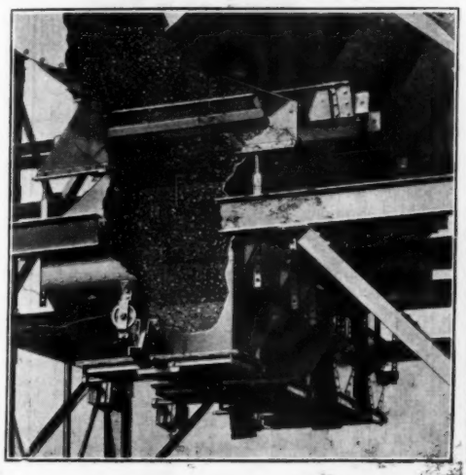
Whether or not you will be in Chicago, write today for descriptive folder.

Hug

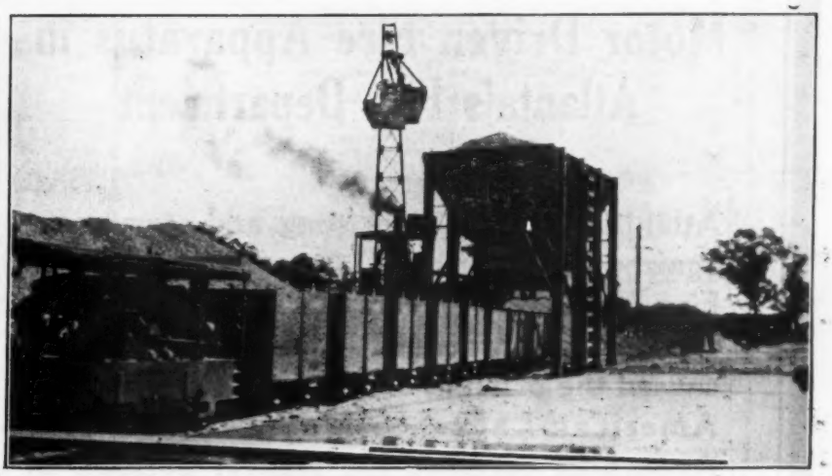
THE HUG CO.
Highland, Illinois

16 Batches-4 Minutes

ONE MAN *Measures and Dumps 16 Batches-8 Cars-in 4 Minutes.* TRAIN LOADED



Arrangement of Blaw-Knox Adjustable Measuring Batchers for 50-ton Suspension BATCHERPLANT. Can also be installed on any wooden bin.



Blaw-Knox Suspension BATCHERPLANT—75-ton capacity. General Construction Company, Gary, Ind.

"Kept the mixer busy"—says Sherwood Moe, President of the General Construction Co., Gary, Ind.—"averaged *four* minutes for loading eight cars of two 33-ft. batches each.

Besides—"in a run of 25,000 sacks we were 338 under the requirement of 3.23 sacks per lineal foot of 20-ft. pavement, which is of course within the 2% limit on the whole run."

Correct proportioning of sand and stone *saved cement.*

His Blaw-Knox BATCHERPLANT stored his aggregate—accurately measured it—loaded his batch boxes and kept the job moving.

AND—R. D. BAKER & CO., COCHRANTON, PA., LOADED THEIR BATCH CARS **WITHOUT STOPPING THE TRAIN.**

ACCURACY and SPEED in the measurement and loading of sand and stone is accomplished by the one-man BATCHERPLANT—whether used for industrial track or truck hauling; or for central mixing.

Learn more about the BATCHERPLANT—
Write for the catalog

TRADE MARK BLAW-KNOX REG. U.S. PAT. OFF.

BLAW-KNOX COMPANY

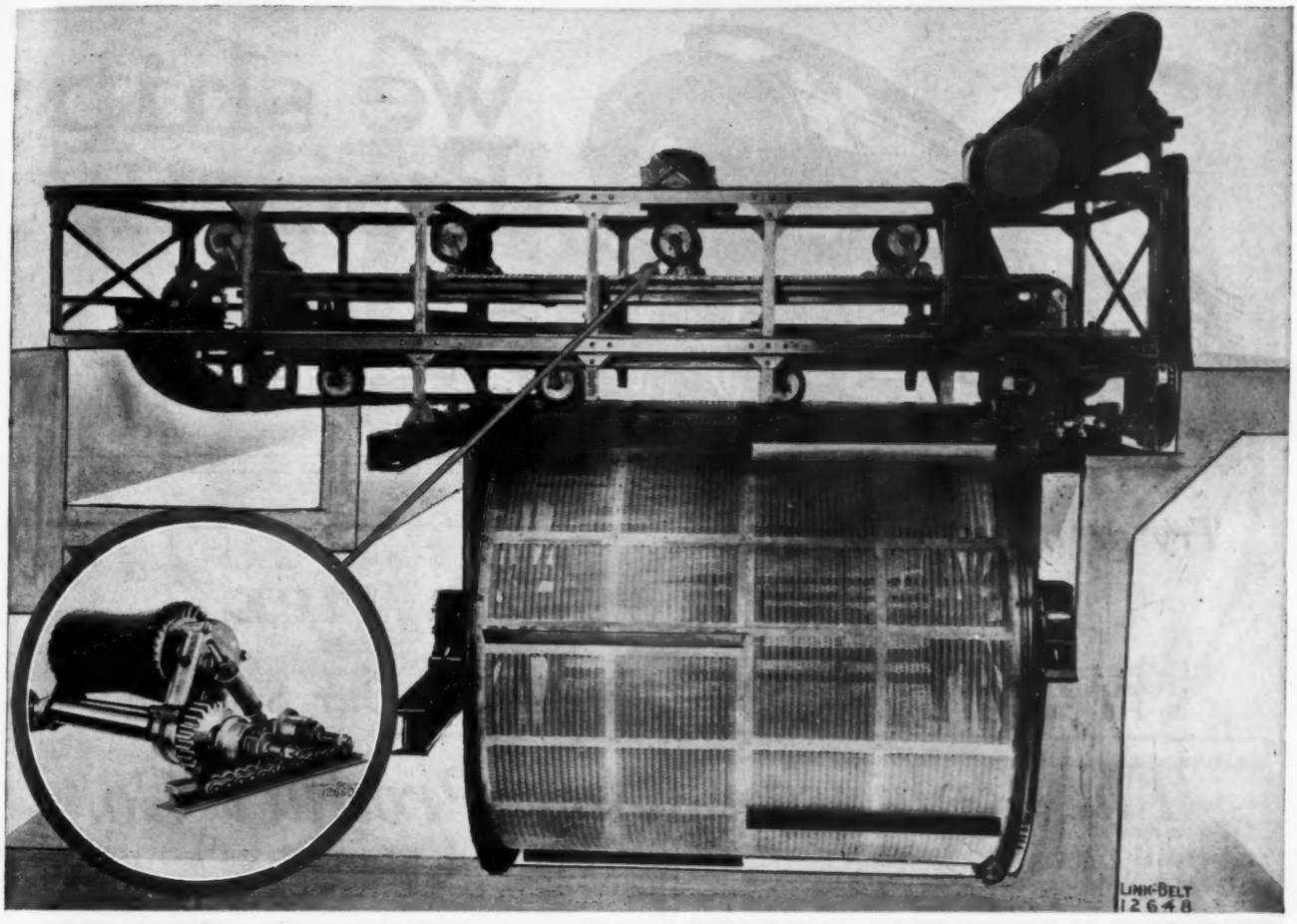
611 Farmer's Bank Bldg., Pittsburgh, Pa.

New York Baltimore Birmingham Chicago Detroit London, Eng.

Mfrs. of
BLAW-KNOX
STEEL FORMS
TURNTABLES
CLAMSHELL BUCKETS
TRANSMISSION TOWERS
HANDY HOUSES

Batcherplant

STEEL STORAGE BIN and MEASURING BATCHERS



Tark Sewage Screen

(Patented)

Fine Apertures Without Clogging

PROBABLY no other sewage clarification system uses such fine apertures as the Tark Sewage Screen. The brush mechanism and the construction of the screen eliminate all clogging and permit the use of fine apertures. This means effective clarification.

Furthermore:

Each Screen is a self-contained unit. For a small volume of sewage, one or two units are sufficient. As the volume increases more units can be added. The City of Milwaukee, for instance, uses eight Tark Sewage Screens.

This advertisement speaks of only two features of the Tark Sewage Screen. Very obviously we cannot tell here the whole story. Our newly issued book, however, does. Send for it. Use the coupon.

LINK-BELT COMPANY
2045 HUNTING PARK AVENUE,
PHILADELPHIA

Please send postpaid—Link-Belt Tark Sewage Screen Book No. 542.

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LINK-BELT COMPANY, 2045 HUNTING PARK AVENUE, PHILADELPHIA, PA.

1422

LINK-BELT

Ruberoid Pipe-seal For Permanent Joints

Ruberoid Pipe-seal has been endorsed and is used by prominent sanitary engineers throughout the country. Hundreds of important sewer installations have proved its exceptional permanence.

It forms a tight, flexible joint which will not crack under the strain of settling ground or realignment of the pipe.

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Main Office and Factory
1220 Buttonwood St., Philadelphia

705 Pine St., St. Louis **1125 Chestnut St. Philadelphia** **227 Park Ave., Baltimore**

WEBER Cataloged Drawing Materials

BUYERS' CLASSIFIED DIRECTORY

of Names of Firms from Whom to Buy Material, Appliances and Machinery Needed by Public Works Departments and Contractors

CONTRACTORS' EQUIPMENT

(See Paving Machinery also)

Air Compressors
Ingersoll-Rand Co.
Mills Cont. Equip. Co.
Schramm, Inc.
Sullivan Machinery Co.

Air Compressors, Portable
Domestic Eng. & Pump Co.
Ingersoll-Rand Co.
Schramm, Inc.

Ash Handling Mach.
Blaw-Knox Co.
Link Belt Co.

Asphalt Paving Tools
Littleford Bros.

Backfillers
Orton & Steinbrenner Co.
Pawling & Harnischfeger Co.

Belt Conveyors
Link Belt Co.

Belt Conveyors, Portable
Link Belt Co.

Bins, Steel Storage
Blaw-Knox Co.
Easton Car & Const. Co.

Blasting Powder
Atlas Powder
Du Pont de Nemours Co.

Bodies, Stakes and Rack, Trucks and Trailers
Mandt Co.

Bodies, Dump (Steel) Trucks and Trailers
Easton Car & Const. Co.
Wood Hydraulic Hoist & Body Co.
Mandt Co.

Dump Bodies, Steel
Easton Car & Const. Co.
Wood Hydraulic Hoist & Body Co.

Bodies, Gravity Side Dump (Steel)

Bodies, Steel Platform with Wooden Stakes and Racks for Trucks and Trailers
Mandt Co.

Brakes
Whitehead & Kales Co.

Bridges
Blaw-Knox Co.
Russell Grader Mfg. Co.
Truscon Steel Co.

Buckets, Automatic & Dumping
Blaw-Knox Co.
Green, L. P.
Link Belt Co.
Littleford Bros.
Orton & Steinbrenner Co.

Bumpers
Whitehead & Kales Co.

Dragline, Orange Peel
Blaw-Knox Co.
L. P. Green
Link Belt Co.
Orton & Steinbrenner Co.
Russell Grader Mfg. Co.

Buildings, Sectional Steel
Blaw-Knox Co.

Bunk Houses
Blaw-Knox Co.

Cars, Dumping and Industrial
Koppel Industrial Car & Equip. Co.
Western Wheeled Scraper Co.

Carts, Concrete
Acme Road Mchy. Co.

Castings
Egyptian Iron Works
South Bend Foundry Co.
U. S. Cast Iron Pipe & Foundry Co.

Central Proportioning Plants
Blaw-Knox Co.

Chutes, Concrete
Egyptian Iron Works
Littleford Bros.
U. S. Cast Iron Pipe & Foundry Co.

Corrugated Metal Culverts
Newport Culvert Co.

Cranes, Locomotive
Ball Engine Co.
Erie Steam Shovel Co.
Koehring Co.
Link Belt Co.
Mills Cont. Equip. Co.
Orton & Steinbrenner
Pawling & Harnischfeger Co.
Orton & Steinbrenner Co.

Cranes and Hoists
Link Belt Co.
Pawling & Harnischfeger Co.

Crushers
Acme Road Mchy. Co.
Austin-West. Rd. Mchy. Co.
Case, J. I. T. M. Co.
Chalmers & Williams, Inc.
Mills Cont. Equip. Co.
Universal Road Mchy. Co.
Galion Iron Works & Mfg. Co.
Western Wheeled Scraper Co.

Ditchers and Graders
Adams, J. D., & Co.
Austin-West. Rd. Mchy. Co.
Baker Mfg. Co.
Keystone Driller Co.
Mills Cont. Equip. Co.
Russell Grader Mfg. Co.
Galion Iron Works & Mfg. Co.
Western Wheeled Scraper Co.

Drags, Bottomless Power
Green, L. P.
Link Belt Co.

Drills, Rock
Ingersoll-Rand Co.
Keystone Driller Co.

Dump Bodies, Steel
Easton Car & Const. Co.
Holt Co., The
Littleford Bros.

Dump Wagons
Acme Road Mchy Co.
Austin-West. Rd. Mchy. Co.
Heil Co., The
Galion Iron Works & Mfg. Co.
LaPlant-Choate Co.
Mills Cont. Equip. Co.
Western Wheeled Scraper Co.

Engines
Avery Co.
Bates Mach. & Tractor Co.
Beaver Mfg. Co.
Case, J. I. T. M. Co.
Domestic Eng. & Pump Co.
Huber Mfg. Co., The
Mills Cont. Equip. Co.

Excavators
Ball Engine Co.
Blaw-Knox Co.
Erie Steam Shovel Co.
L. P. Green
Koehring Co.
Orton & Steinbrenner Co.
Pawling & Harnischfeger Co.

Explosives
Atlas Powder Co.
E. I. du Pont de Nemours & Co.

Fabric Steel Reinforcing

Reinforcing Steel

Garbage Bodies, for Trucks and Trailers
Mandt Co.
Wood Hydraulic Hoist & Body Co.

Hammer Drills
Ingersoll-Rand Co.

Heaters, Asphalt & Tar
Connery & Co., Inc.
Farasey, J. D., Mfg. Co.
Littleford Bros.
Universal Road Mchy. Co.

Hitches
Whitehead & Kales Co.

Hoists
American Cement Mach. Co.
Domestic Eng. & Pump Co.
Ingersoll-Rand Co.
Link Belt Co.
Mills Cont. Equip. Co.
Pawling & Harnischfeger Co.

Hoists, Hand, for Trucks and Trailers
Mandt Co.
Rock Mfg. Co.
Wood Hydraulic Hoist & Body Co.

Hoists, Hydraulic and Hand for Motor Trucks
Heil Co.
Mandt Co.

Hose, Suction
Edson Mfg. Co.

Installers (Joint)
Servicised Products Co.

Kettles, Asphalt & Tar
Connery & Co., Inc.
Littleford Bros.
Universal Road Mchy Co.

Loading Machines
Link Belt Co.

Locomotive Attachment for Fordson
Whitehead & Kales Co.

Metal Lath
Truscon Steel Co.

Motor Trucks
Avery Co.
International Motor Co.
Wood Hydraulic Hoist & Body Co.

Paint
Ruberoid Co.
Servicised Products Co.

Paving Mixers
American Cement Mach. Co.
Koehring Co.
Mills Cont. Equip. Co.

Paving and Road Machinery
Chausse Oil Burner Co.

Pintle Hooks
Detroit Trailer Co.

Plows
Adams, J. D., & Co.
Austin-West. Rd. Mchy. Co.
Avery Co.
Case, J. I. T. M. Co.
Russell Grader Mfg. Co.
Galion Iron Works & Mfg. Co.
Western Wheeled Scraper Co.
Wiard Plow Co.

Pneumatic Concrete Mixers and Placers

Pneumatic Tools
Ingersoll-Rand Co.
Schramm, Inc.

Pumps
Aurora Pump & Mfg. Co.
Dayton-Dowd Co.
De Laval Steam Turbine Co.
Domestic Eng. & Pump Co.
Edson Mfg. Co.
Emerson Pump & Valve Co.
Ingersoll-Rand Co.
Keystone Driller Co.
Mills Cont. Equip. Co.

Pumps, Barge and Scow
Domestic Eng. & Pump Co.
Edson Mfg. Co.

Reinforcing Steel
Truscon Steel Co.
Ingersoll-Rand Co.

Road Bands
Whitehead & Kales Co.

Sand and Stone Measuring Devices
Blaw-Knox Co.

Scrapers
Baker Mfg. Co.
Green, L. P.
Link Belt Co.

Sharpeners, for Rock Drill Steel
Ingersoll-Rand Co.

Snow Removal Outfits
Adams, J. D., & Co.
Austin-West. Rd. Mchy. Co.
Avery Co.
Bates Mach. & Tractor Co.
Baker Mfg. Co.
Case, J. I. T. M. Co.
Holt Mfg. Co., Inc.
LaPlant-Choate Co.
Russell Grader Mfg. Co.

Special Worm and Worm Wheel for Fordson
Whitehead & Kales Co.

Standard Steel Buildings
Blaw-Knox Co.
Littleford Bros.
Truscon Steel Co.

Steam Shovels
Ball Engine Co.
Erie Steam Shovel Co.
Keystone Driller Co.
Orton & Steinbrenner Co.

Surface Heaters, Asphalt
Chausse Oil Burner Co.

Tool Heaters, Asphalt
Chausse Oil Burner Co.
Littleford Bros.

Torches, Kerosene Portable
Chausse Oil Burner Co.

Tow Hooks (Trucks)
Detroit Trailer Co.

Track-Laying Type of Tractors
Avery Company
Bates Mach. & Tractor Co.
Huber Mfg. Co., The

Tractors
Avery Company
Bates Mach. & Tractor Co.
Case, J. I. T. M. Co.
Holt Mfg. Co.
Huber Mfg. Co., The
Mills Cont. Equip. Co.

Tractors, Electric Motor
Walker Vehicle Co.

Trailers
Mandt Co.
Whitehead & Kales Co.

Trucks, Electric Motor
Walker Vehicle Co.

Turntables for Trucks
Blaw-Knox Co.

FIRE DEPARTMENT EQUIPMENT

Combination Chemical and Hose Wagons
American-La France Fire Engine Co.

Fire Alarm System
Loper Fire Alarm Co.

Pumping Engines—Gasoline
American-La France Fire Engine Co.
DeLaval Steam Turbine Co.
Domestic Eng. & Pump Co.
Evinrude Motor Co.

Triple Combination Motor
American-La France Fire Engine Co.

Underwriters' Pumps
DeLaval Steam Turbine Co.
Ingersoll-Rand Co.

HIGHWAY BRIDGE MATERIAL

Expansion Devices
Egyptian Iron Works

Name Plates
Egyptian Iron Works

MUNICIPAL EQUIPMENT

Signs, Low Down Electric Lighted Street Intersection and Safety Zone
Ohio Traffic Devices Co.

Signs, Warning, Direction
Ohio Traffic Devices Co.

Signs, Street Names, "No Parking"
Ohio Traffic Devices Co.

Highway Signs, Warning, Direction, Street, Name, Street, Intersection, No Parking
Ohio Traffic Devices Co.

MISCELLANEOUS

Oil Burners and Heaters
Chausse Oil Burner Co.

Tanks, Welded Steel
Heil Co.
Littleford Bros.

PAVING AND ROAD MACHINERY

Air Compressors, Portable
Domestic Eng. & Pump Co.
Ingersoll-Rand Co.
Schramm, Inc.

Asphalt Distributors
E. D. Etnyre & Co.
Kinney Mfg. Co.

Asphalt Plants
Cummer & Son Co.
Farasey, J. D., Mfg. Co.
Hetherington & Berner
Warren Bros. Co.

Car Unloaders
Acme Road Mchy. Co.
Galion Iron Works & Mfg. Co.
Mills Cont. Equip. Co.
Universal Road Mchy Co.

Caulking Material
Servicised Products Co.

Concrete Mixers
American Cement Mach. Co.
Jaeger Mch. Co., The
Raber & Lang Mfg. Co.
Koehring Co.
Mills Cont. Equip. Co.

Concrete Continuous Proportioning Mixers
Raber & Lang Mfg. Co.

Culverts, Corrugated Metal
Austin-West. Rd. Mchy. Co.
Galion Iron Works & Mfg. Co.
The Newport Culvert Co.

Forms, Steel for Concreting
Blaw-Knox Co.

Gravel Screening Plants and Loaders
Austin-West. Rd. Mchy. Co.
Chalmers & Williams, Inc.
L. P. Green
Universal Road Mchy. Co.
Galion Iron Works & Mfg. Co.
Western Wheeled Scraper Co.

Gravel, Pit, Hoist and Dragline Equipment
Domestic Eng. & Pump Co.
Link Belt Co.

Heaters
Littleford Bros.

Hose, Suction
Edson Mfg. Co.

Oil Distributors and Sprayers
Acme Road Mach. Co.
Austin-West. Rd. Mchy. Co.
Connery & Co., Inc.
Etnyre & Co., E. D.
Littleford Bros.
The Kinney Mfg. Co.

Paving Breakers
Ingersoll-Rand Co.

Pumps, Oil and Asphalt
The Kinney Mfg. Co.
Etnyre & Co., E. D.

Pumps, Gasoline, Water
Domestic Eng. & Pump Co.
Edson Mfg. Co.

See Alphabetical Index on last white page

BUYERS' CLASSIFIED DIRECTORY
(CONTINUED)

Road Drags
Acme Road Mchy. Co.
Adams, J. D., & Co.
Austin-West. Rd. Mchy. Co.
Russell Grader Mfg. Co.
Galion Iron Works & Mfg. Co.
Western Wheeled Scraper Co.

Road Graders
Acme Road Mchy. Co.
Adams, J. D., & Co.
Austin-West. Rd. Mchy. Co.
Baker Mfg. Co.
Ball Engine Co.
Erie Steam Shovel Co.
Good Rds. Mchy. Co., Inc.
Russell Grader Mfg. Co.
Universal Road Mchy. Co.
Galion Iron Works & Mfg. Co.
Mills Cont. Equip. Co.
Wehr Co.
Western Wheeled Scraper Co.

Road Levellers
Austin-West. Rd. Mchy. Co.
Holt Mfg. Co., Inc.

Road Maintainers
Adams, J. D., & Co.
Avery Co.
Austin-West. Rd. Mchy. Co.
Littleford Bros.
Russell Grader Mfg. Co.
Galion Iron Works & Mfg. Co.
Wehr Co.
Western Wheeled Scraper Co.

Road Pavement Testing Machines
Ingersoll-Rand Co.

Road Rollers
Acme Road Mchy. Co.
Avery Co.
Austin-West. Rd. Mchy. Co.
Buffalo-Springfield Rol. Co.
Case, J. I. T. M. Co.
Huber Mfg. Co., The

Road & Street Repair Plants
Littleford Bros.

Rock Crushers
Acme Road Mchy. Co.
Austin-West. Rd. Mchy. Co.
Case, J. I. T. M. Co.
Chalmers & Williams, Inc.
Mills Cont. Equip. Co.
Universal Road Mchy. Co.
Galion Iron Works & Mfg. Co.
Western Wheeled Scraper Co.

Rock Drills
Ingersoll-Rand Co.
Galion Iron Works & Mfg. Co.

Motor Tandem Rollers
Austin-West. Rd. Mchy. Co.

Scarifiers
Acme Road Mchy. Co.
Adams, J. D., & Co.
Austin-West. Rd. Mchy. Co.
Avery Co.
Buffalo-Springfield Rol. Co.
Case, J. I. T. M. Co.
Galion Iron Works & Mfg. Co.
Huber Mfg. Co., The
Russell Grader Mfg. Co.
Universal Road Mchy. Co.
Wehr Co.
Western Wheeled Scraper Co.

Scrapers
Acme Road Mchy. Co.
Adams, J. D., & Co.
Austin-West. Rd. Mchy. Co.
Baker Mfg. Co.
L. P. Green
Link Belt Co.
Mills Cont. Equip. Co.
Russell Grader Mfg. Co.
Galion Iron Works & Mfg. Co.
Western Wheeled Scraper Co.

Screens
Acme Road Mchy. Co.
Austin-West. Rd. Mchy. Co.
Chalmers & Williams, Inc.
L. P. Green
Link Belt Co.
Russell Grader Mfg. Co.
Universal Road Mchy. Co.
Galion Iron Works & Mfg. Co.
Western Wheeled Scraper Co.

Spreaders
Acme Road Mchy. Co.
Western Wheeled Scraper Co.

Steel Forms
Blaw-Knox Co.
Heltzel Steel Form & Iron Works
Mills Cont. Equip. Co.

Tar Kettles, Asphalt Heaters, etc.
Acme Road Mchy. Co.
Connery & Co., Inc.
The Kinney Mfg. Co.
Warren Bros. Co.

Tractors
Avery Co.
Bates Mach. & Tractor Co.
Case, J. I. T. M. Co.
Holt Mfg. Co., Inc.
Huber Mfg. Co., The
Mills Cont. Equip. Co.

PAVING MATERIALS

Asphalt
Asphalt Products Co.
Standard Oil Co. (Ind.)
Standard Oil Co. (N. Y.)
Texas Co.

Asphalt (Sponge Cushion)
Servicised Products Co.

Binders
American Tar Products Co.
Barrett Co., The
Standard Oil Co. (Ind.)
Standard Oil Co. (N. Y.)

Bituminous Pavements
American Tar Products Co.
Barrett Co., The
Warren Bros. Co.

Contraction Joints
Truscon Steel Co.
Servicised Products Co.

Creosoted Wood Block
Servicised Products Co.

Curb Bars
Truscon Steel Co.

Expansion Joints
Barrett Co., The
Philip Carey Co.
Hoosier Asphalt Co.
Asphalt Products Co.
Truscon Steel Co.
Servicised Products Co.

Fluxing Asphaltums
Standard Oil Co. (Ind.)
Indian Refining Co.

Oil (Roads)
Barrett Co., The
Headley Good Roads Co.
Indian Refining Co.
Standard Oil Co. (Ind.)
Standard Oil Co. (N. Y.)

Paving Fillers
Servicised Products Co.
Standard Oil Co. (Ind.)

Reinforcing Mesh
Nat'l Steel Fabric Co.
Truscon Steel Co.

Road Tar
American Tar Products Co.

SEWERAGE

Culvert Molds, Concrete
Galion Iron Works & Mfg. Co.
Raber & Lang Mfg. Co.

Culverts
Galion Iron Works & Mfg. Co.
The Newport Culvert Co.
The Robinson Clay Prod.
Russell Grader Mfg. Co.

Drains
Dee, Wm. E.

Drain Tile
Robinson Clay Prod. Co.

Flush Tank Siphons
Pacific Flush-Tank Co.

Inlet Basins
Flockhart Foundry Co.

Hose, Suction
Edson Mfg. Co.

Joint Compound (Bituminous)
Servicised Products Co.
Ruberoid Co.

Manhole Heads
Dee, Wm. E.
Flockhart Foundry Co.

Molds, Sewer Pipe, Concrete
Raber & Lang Mfg. Co.

Pipe (Cast Iron)
American Casting Co.
McWane Cast Iron Pipe Co.
Nat'l Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Fdry. Co.
Wood, R. D., & Co.

Pipe Cleaning Machines
W. H. Stewart

Pumps
DeLaval Steam Turbine Co.
Domestic Eng. & Pump Co.
Edson Mfg. Co.
Ingersoll-Rand Co.
Mills Cont. Equip. Co.

Pumps, Diaphragm, Odorless
Domestic Eng. & Pump Co.
Edson Mfg. Co.

Rods
W. H. Stewart

Segment Block Sewer
Robinson Clay Prod. Co.

Sewage Disposal Apparatus
Direct Oxidation Disposal Corp.
Dorr Co.
Link Belt Co.
Pacific Flush-Tank Co.

Sewage Disposal Plants
Direct Oxidation Disposal Corp.
Dorr Co.
Link Belt Co.
Sanitation Corporation

Sewage Disinfection
Direct Oxidation Disposal Corp.
Electro Bleaching Gas Co.

Sewage Ejectors
Pacific Flush-Tank Co.

Sewage Pumps
DeLaval Steam Turbine Co.
Domestic Eng. & Pump Co.
Edson Mfg. Co.

Sewage Screens
Link Belt Co.

Sewer Joint Compounds
Pacific Flush-Tank Co.
Servicised Products Co.

Sewer Castings
Flockhart Foundry Co.

Vitrified Fire Clay Sewer Tiles
East Ohio Sewer Pipe Co.
Robinson Clay Prod. Co.

Vitrified Sewer Pipe
Eastern Clay Prod. Asso.
East Ohio Sewer Pipe Co.
Ohio Vitrified Pipe Co.
Robinson Clay Prod. Co.

STREET CLEANING AND REFUSE DISPOSAL

Ash Bodies
Heil Co.
Mandt Co.

Carts
Acme Road Mchy. Co.
Western Wheeled Scraper Co.

Garbage Bodies, Steel
Heil Co., The.
Littleford Bros.
Mandt Co.

Incinerators
Decarie Incinerator Co.
Stacy-Bates Co.

Manholes—Catch Basins
Wm. E. Dee Co.
South Bend Foundry Co.

Sprinkling Wagons and Flushers
Austin-West. Rd. Mchy. Co.
Etnyre & Co., E. D.
The Kinney Mfg. Co.

Street Sweepers
Austin-West. Rd. Mchy. Co.
Springfield Motor Sweeper Co.
Universal Road Mchy. Co.

WATER WORKS

Air Compressors
Domestic Eng. & Pump Co.
Ingersoll-Rand Co.
Schramm, Inc.

Air Lift
Ingersoll-Rand Co.

Brass Water Connection
Mueller, H., Mfg. Co.

Cast Iron Pipe
American Casting Co.
Wood, R. D.
Cast Iron Pipe Publicity Bureau
McWane Cast Iron Pipe Co.
National Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.

Centrifugal Pumps
DeLaval Steam Turbine Co.
Ingersoll-Rand Co.

Chloride of Lime
Penn Salt Mfg. Co.

Chlorine Liquid
Electro Bleaching Gas Co.

Deep Well Drills
Ingersoll-Rand Co.
Keystone Driller Co.

Deep Well Pumps
Cook, A. D.
Domestic Eng. & Pump Co.
Ingersoll-Rand Co.
Keystone Driller Co.

Disinfecting Chemicals
Electro Bleaching Gas Co.
Penn Salt Mfg. Co.

Filters
N. Y. Continental Jewel Filtration Co.

Filtration Plants
Filter Alum
Du Pont de Nemours Co.

Fire Hydrants
Bourbon Cop. & Br. Mfg.Co
Clark Co., H. W.
Darling Valve & Mfg. Co.
R. D. Wood & Co.

Flap Valves
Coldwell-Wilcox Co.

Hose, Suction
Edson Mfg. Co.

Meters
Badger Meter Mfg. Co.
Buffalo Meter Co.
Clark Co., H. W.
Federal Meter Co.
Gamon Meter Co.
Hersey Mfg. Co.
Pittsburgh Meter Co.
Thompson Meter Co.
Union Water Meter Co.

Meter Boxes
Clark Co., H. W.
Pittsburgh Meter Co.

Meter Testing Machines
Clark Co., H. W.
Mueller, H., Mfg. Co.
Pittsburgh Meter Co.

Pipe, Cast Iron
American Casting Co.
McWane Cast Iron Pipe Co.
National Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Fdy. Co.
Wood, R. D.

Pipe, Corrugated Metal
Newport Culvert Co.

Pipe, Steel
East Jersey Pipe Co.
Littleford Bros.

Pipe, Wood
A. Wyckoff & Son Co.

Pumps
Aurora Pump & Mfg. Co.
Clark Co., H. W.
Cook, A. D.
Dayton-Dowd Co.
DeLaval Steam Turbine Co.
Edson Mfg. Co.
McIntosh & Seymour
Ingersoll-Rand Co.
Keystone Driller Co.

Pumping Engines
DeLaval Steam Turbine Co.
McIntosh & Seymour
Sterling Engine Co.

Screens for Wells
Cook, A. D.

Service Boxes
Mueller, H., Mfg. Co.

Shear Valves
Coldwell-Wilcox Co.

Sleeves and Valves
Darling Valve & Mfg. Co
Mueller, H., Mfg. Co.
Smith, A. P., Mfg. Co.

Sluice Gates
Coldwell-Wilcox Co.

Sprinkling and Flushing Hydrants
Mueller, H., Mfg. Co.

Steel Stacks
Heil Co., The
Littleford Bros.

Strainers
Cook, A. D.

Tanks
Farasey, J. D., Mfg. Co.
Heil Co., The
Littleford Bros.

Tanks, Towers, Standpipes
Connery & Co., Inc.
Farasey, J. D., Mfg. Co.
Littleford Bros.

Tapping Machines
Mueller, H., Mfg. Co.
Smith, A. P., Mfg. Co.

Tunnel Liner Plates
Blaw-Knox Co.
Truscon Steel Co.

Valves
Bourbon Cop. & Br. Mfg.Co
Clark Co., H. W.
Darling Valve & Mfg. Co.
Mueller, H., Mfg. Co.

Vitrified Pipe
Eastern Clay Prod. Asso.

Water Main Cleaning
Nat'l Water Main Cleaning Co.

Water Purification
Electro Bleaching Gas Co.
N. Y. Continental Jewel Filtration Co.

Water Sterlization
Electro Bleaching Gas Co.

Water Strainers
Mueller, H., Mfg. Co.

Water Supply from Well Systems
Cook, A. D.
Heil Co., The

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